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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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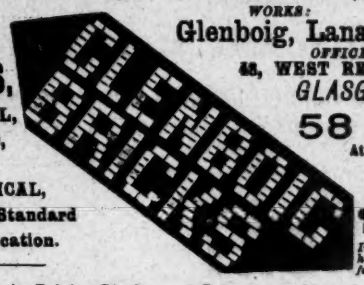

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EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

VOL. CLVI., No. 3052.] WEDNESDAY, NOVEMBER 9, 1921. [73RD YEAR.

EDITORIAL NOTES.

Parliament and the Gas Regulation Act.

ATTENTION was drawn the other week [see "JOURNAL" for Oct. 26, p. 298] to the relatively few local authorities who had applied for Orders under section 1 of the Gas Regulation Act, to transfer themselves from the system of working and charging by volume to the heat-unit basis. This hesitancy is not, in our opinion, due to any feeling that there is no value to the industry in the new order of things, but rather that municipal authorities have not the same pressure behind them that gas companies have owing to the deplorable state in which their share or stock holders have been placed through the complete reversal of economic conditions. Anyway, all gas-supplying local authorities will be brought under the Act in due time. Those readers who have followed our review of the Gas Acts for the session which is now about to end, will have come to the conclusion that there is little use applying through a Bill in Parliament for powers having reference to price, quality, purity, pressure, or testing. In these matters, Parliament is working strictly in accordance with the terms of the Gas Regulation Act, and is permitting no deviations other than in respect of the South Metropolitan plan of dealing with profits in lieu of the sliding-scale; and in this respect the precedent is being followed. The conversion of standard and maximum prices to the therm basis is being left to the Board of Trade, to be dealt with in conformity with the directions of the Act and the principles adopted by the Board.

In the present session, certain local authorities applied for revised maximum prices per 1000 c.ft. They have had the prices revised; but only to find they have been pursuing a double route when one would have sufficed. The amended price per 1000 c.ft. has in every case been accompanied by a proviso that, within one year or half year from the passing of the Special Act, the authorities concerned shall apply to the Board of Trade for an Order under section 1 of the Gas Regulation Act; and by the Order a maximum price per therm is to be fixed corresponding as nearly as may be to the maximum price authorized by the Special Act, "without "any addition in respect of increases in the costs of production and supply of gas which have occurred since the 30th "day of June, 1914." This means that, to the best of the knowledge of the Parliamentary Committees dealing with the Bills, the cost increases have been duly satisfied in the new maximum price per 1000 c.ft. allowed. In view of this proviso, which compels an application to the Board within twelve or six months, those local authorities who are considering the promotion of Gas Bills in the next session of Parliament, and are asking for a revision of price or of their qualitative standards, may reconsider their decision, and go to the Board of Trade direct. It seems to be the most sensible course.

One other matter. There are complaints regarding delay in the issue of Orders. There is no doubt the Director of Gas Administration and his staff are finding the work of settling the applications under section 1 of the Gas Regulation Act one of tremendous weight. This must be admitted, particularly with the scrupulous care that has to be exercised in the investigation of details. They are, however, steadily ploughing through the work, which is not being done in any perfunctory or haphazard manner. To do justice to all parties concerned, there has to be close individual examination and treatment; and we would infinitely prefer a little delay to a mass of dissatisfaction due to rush performance. The work that is being done at the initial stage is fundamental; and the better it is carried out, the smoother will be the subsequent operations of gas undertakings, and the easier will be the later work of revision, when cause can be shown for change either in the price per therm or the declared calorific value. We see no reason for any attempt to harass the department, though there is sympathy with those gas undertakings which are being held-up in price and dividend revision owing to the amount of work that has come almost as an avalanche upon the department.

Preparing to Attack Gas-Lighting Territory.

ELECTRIC lighting is not making the rapid progress that the electrical people think it deserves. This is not because the light, in the eyes of electricians, suffers from any demerit whatsoever. It possesses, according to many of them, all the virtues it is possible for an artificial light to possess. Grudgingly, a few confess to one drawback, which is that its intrinsic brilliancy is abominably high; so high, in fact, that the efficiency of the lights has to be degraded, by screening the filament, in order to protect the eyes of users. The fact that electric lighting has not made the progress that electrical men are under the impression it should have done, is attested by action and words. The Electrical Lamp Manufacturers' Association are going to start a new lighting campaign—not only in the home, but for the office, the shop, the factory, and the public ways. They would not need to do this if the lighting business was flowing in with the vigour of spring tides. But it is not. The contractors everywhere are complaining that work is dull; and obviously the lamp makers could do with more business. The Association have, in connection with the campaign, produced an electricity and gas map of Great Britain; and the figures for gas tower so supreme over those for electricity that it is remarked: "The "disparity between the gas and electrical figures affords "a powerful reminder of the immense field which has yet "to be worked-over in connection with electric lighting." Now there are causes for a condition which shows that gas has in this country a much larger share than electricity in lighting. This condition existed before the war, when circumstances were much easier; and the same thing is found to obtain when the conditions are not so easy, but very difficult. The causes for the difference are more substantial than can be removed by mere words. As they existed before, they exist now, only in intensified degree.

But there is the announced intention of the Electric Lamp Manufacturers' Association to make and develop a very determined attack upon the territory occupied by gas lighting. It is the only territory they can attack; for oil-lamps and candles have been practically swept from general lighting. They will probably gain some measure of success; but the degree of success will depend upon the extent of the resistance offered by the gas industry. Resistance must be to a large extent provided by the work done by gas undertakings in keeping up the end of the lighting business by good service, and by doing all possible to have inefficient burners and lamps replaced by efficient ones, and to see that everything reasonably possible is done to maintain them in proper condition. Under the Gas Regulation Act, gas undertakings are bound to regulate burners to the declared calorific power of their gas, and minimum pressures are prescribed.

The defensive operations of gas undertakings, however, must not stop here. Much else must be done by them; and they must not let go any instrument that will enable them to offer resistance to the attacks that have been resolved upon, and are referred to as a new electric lighting campaign. Many gas undertakings, for example, abandoned

high-pressure gas lighting for shop purposes during the war —a business that was in 1914 advancing with remarkable strides. Following this wartime interruption, came the introduction of "summer time," and the earlier closing hours for shops. There are other gas undertakings that had lighting equipments installed, and have not actually relinquished the provision of high-pressure lamps, but are carrying on the business in a manner which can only be described as more or less half-hearted. Few there be who have since the war introduced this system of lighting in their shopping areas; and yet it is one of the best of means for resisting attacks from lighting competitors, and withal a very fine advertising agent for gas. Those who hesitate and those who doubt may find encouragement and inducement in the experiences in South London. There the South Metropolitan Gas Company have brought the high-pressure lighting up to pre-war standard. Their success in the business—the number of high-pressure lamps to-day must be approximately 5000, compared with 3136 when we described what was being done in an article on "The Lights o' South London" [see "JOURNAL," Jan. 21, 1913]—proves that, even for the fewer hours that artificial light is needed, a shopkeeper will have the best light available, if he can get it.

Tully Gas and Consumption Tests.

THE most important part of Mr. A. M'Donald's address to the Scottish Junior Gas Association (Eastern District) is where he bears testimony to the fact that, supplying in the Prestonpans area all-Tully gas, and not bothering about secondary products, he is giving perfect satisfaction to all concerned. Since the middle of April last he has been doing this; and with 1200 consumers, his complaints only average half-a-dozen per day. Mere adjustment of the burners satisfies the complainers—indeed, in most cases the closing of the air-regulator brings about a complete composure of any difficulty. This one practical fact has more weight with us than all the other information given by Mr. M'Donald, because of the deficiencies found in that subsequent information, which make it impossible to judge the value of the figures, or to deduce from them anything very reliable to go to confirm statements such as this example: "There is no doubt that the consumer appre-"ciates the fact that he gets much more duty out of Tully "gas than he did out of ordinary coal gas." Now why did not Mr. M'Donald supplement his tests and figures to prove this assertion? So far as it is possible to judge, he could have done so in some cases, but not in all.

The average production of Tully gas at Prestonpans per ton of Preston Links treble nuts is 37,000 c.ft. of 375 B.Th.U., which is equal to 13,875,000 B.Th.U. per ton, or 138·75 therms. The maximum production recorded is 49,580 c.ft. per ton. Assuming this is of 375 B.Th.U. (Mr. M'Donald declares that the gas is of an "unvarying" quality of about 375), this would be equal to 18,592,500 B.Th.U., or 185·9 therms. And no account is taken of fuel in these figures. Where we find the paper disappointing is in the scantiness of the information in the tables referring to tests made of the gas for lighting and boiling purposes. From what is known of the composition of the gas, theoretically we should expect the flames to be short and intense, and to give a good efficiency. Taking the lighting burner tests, Mr. M'Donald only supplies the rate of consumption per hour by different burners at various pressures; he says nothing whatever about the candle power obtained at those consumptions and pressures. Take the "bijou" inverted burner. It is stated that the gas consumption is 2·2 c.ft. at 15-10ths pressure. This means an expenditure of 825 B.Th.U. If the burner (and this is what we want to know positively) gives a light of 50 c.p., then this would prove the assertion in the paper as to the good effects of the gas for lighting, inasmuch as, with gas of 500 B.Th.U., we have seen tests showing approximately 50 c.p. with a consumption of 2 c.ft., or roughly 1000 B.Th.U. For upright (not inverted) burners, Mr. James W. Wood submits that a fair standard efficiency is 30 candles per 1000 B.Th.U. Leaving lighting for power, the 18·5 c.ft. consumed per H.P. is also a good figure, being only 6937 B.Th.U. per H.P. Looking at the boiling tests, we are absolutely lost again through the omission of one or two factors necessary to judgment—the quantity of water and the starting temperature. Mr. M'Donald speaks of a quart domestic pot. Does he mean by this that a quart of water was boiled in these tests? In two of the tests, he says the consumption was 2·75 c.ft., which is equal to 1030 B.Th.U. A quart of water contains 2½ lbs.; and, assuming the starting temperature is 48°, to raise this quantity of water to the boiling-point would mean $164° \times 2\frac{1}{2} = 410°$. The expenditure of 1030 B.Th.U. would therefore show, 410 B.Th.U. being absorbed, an efficiency of only about 40 p.ct. If the quantity of water used was less than a quart, the efficiency would, of course, be lower. The figures are inconclusive through insufficiency in supporting the submissions in the paper.

There is one thing in connection with these gasification plants that is badly wanted in the interests of the gas industry as a whole; and it is that there should be thorough expert exploration of them by the Gas Investigation Committee of the Institution and Leeds University, and not only into manufacture, but use. Here we have these high figures as to the therm productions per ton; and the testimony as to consumers' satisfaction, with this gas of 375 B.Th.U. There is also the demonstration of the gas giving healthy—in fact, intense—flames with the primary air supply shut-off, and aeration for combustion purposes being provided only from the air surrounding the flame. These are matters that require, in the interests of the gas industry, investigation in one of these areas relying entirely upon Tully gas. Several gas engineers have been to Prestonpans and other places, and are satisfied. It is understood that Goring will shortly have a plant that will be of the modern type; and we have not heard the last of material progress in the making of therms from a given coal by this particular plant. But we do emphasize the suggestion that a thorough scientific investigation should be made, so as to show exactly what is and can be done. Such an investigation in competent hands, we are sure, Mr. Tully would welcome, and would be willing to see that the necessary facilities were provided.

American Practices Seen through English Eyes.

IN a nutshell (so to speak) Mr. G. M. Gill, the Chief Engineer of the South Metropolitan Gas Company, has given us, through the lecture to the London and Southern Junior Association, one of the most interesting and instructive views that we have had of certain differences between American gas practices and our own [see *ante* p. 375]. This is the result of his personal observations during a tour of American gas-works to ascertain what our confrères "over the way" are doing. What he says shows that in gas-producing methods, we have not much to learn from America, any more than they have from us. In some points they are somewhat ahead of us; in others, we may harbour the view that we are somewhat ahead of them. The differences in circumstances and legislative control in the two countries have some bearing on practice, but not altogether so. One thing that we cannot help admiring about our American friends is the prompt manner which, when alarmed as to the future prospects of oil, they brought about, as it were, a renaissance in the process of coal-gas manufacture. This had been allowed more or less to slumber for those many years during which oil was cheap, and carburetted water gas gained the ascendant, pushing coal-gas making into quite a back position. But directly the outlook for oil became less satisfactory, there was a revival of coal-gas plant and operations and the adoption of high standards in construction and processes, into which various novel features or details have been introduced, from which we are profiting in this country, just as America is profiting from our work here in respect of continuous verticals and other plant, and the production and sale of gas of a lower thermal value per cubic foot.

Probably, more through opportunity than of set intention, the American gas industry has operated in the direction of fuel conservation to a very large extent. There carburetted water gas is supplied to the extent of anything from 50 to 70 and 80 p.ct. of the total mixture; and some supply areas are still served with "neat" carburetted water gas. Then another difference is that several gas-works have adopted coke-oven plants; while the distribution of coke-oven gas from outside plants is a common practice. In this connection Mr. Gill pointed out that in the States the coke-oven plants are erected near to where the chief products—the coke and gas—are required, and not near to the collieries. This is a practice which we have always maintained has much to commend it. Coal is an article easy of transmission; and from the points of view of national economy, devolution of industrial work for the people, and the work-

ing-up and distribution of the products, it is better to have carbonizing plants scattered about the country than concentrated in limited areas. Such centralization would tend to the concentration of industry and the massing of industrial workers to the economic detriment of all parts of the country. Any economy gained in the one respect would be overwhelmed by the losses in other respects. Moreover, we believe in towns being as largely self-contained as locality and density of population will permit, and that within circumscribed areas there should be realized as much economy as possible. Anthracite is a good heating coal; but we do not like the production of a smokeless atmosphere as in New York by the provision of a method of convected heating which entails cartage through the streets and house-to-house delivery of the fuel, supplemented by labour in the house, so much as we do the provision of radiant heat by the conveyance by subterranean means of a fluid fuel such as gas. It is in the direction of cooking and heating that the American gas undertakings are apparently doing their largest business, and are prosecuting its extension; for they have relinquished a good part of the lighting. "Many of the "gas engineers over there," says Mr. Gill, "realize what a "mistake they have made in not putting up a bigger fight "to retain gas lighting, as they see now they could have "done to a large extent." In this matter, the gas engineers have had a serious drawback, in the compulsorily high candle and calorific power gas they have had to supply, which for incandescent lighting purposes (as for most other uses) is a mischievous solecism or *mésalliance*, and withal wasteful.

There are several other points in the address that are interesting to the gas engineer. There is the extensive use of silica retorts, with their property of rapid heat transmission, and their capacity for carbonizing from 1½ to 2 cwt. of coal per retort per hour. There is also almost general provision on stoking machines for the weighing of charges. Another feature is the use of the Congdon standpipes, which, as we have lately seen, have been under trial at Beckton; and an installation is now being made at the Vauxhall works of the South Metropolitan Gas Company. The instance mentioned of the storage of coke in air-tight vessels for use red-hot in water-gas plants is particularly interesting, but is rather crude compared with the direct transfer by telphers to water-gas generators of incandescent coke from horizontal retorts, as at the Brentford Gas-Works. In dealing with the consumers, the reference to the Doherty three-rate system of charging is arresting. It looks as cumbrous as some of the systems of charging for electricity in this country; and we hardly think that under the condition of extensive prepayment gas-meter use it could be applied in this country. As to the fairness of the first charge—the "consumer's charge"—which includes all items of cost that are common and practically uniform in the case of all consumers, there can be no question; but we do not like the limitation and somewhat arbitrary charge imposed by the second rate—the maximum demand charge. It may be the means of increasing the consumption of gas in America; but at the moment we have a preference for flat-rates per therm, and as low as they can be brought, with discounts in all exceptional circumstances, or differential prices in the cases of large consumptions for given purposes.

These are only a few of the subjects in the address, in which we fancy Mr. Gill must have compressed much of the cream of the technical information gained from his visit to America.

The Miners' Part in Restoration.

THE Miners' Federation are in an unenviable position—due in no small measure to extremist guidance and the pusillanimity of the moderates on the Council of that body, which together led to the three months' strike, and inflicted the last blow required to reduce the industry and commerce of this country to a stagnant and impotent condition. Now the Federation are seriously alarmed—alarmed over the unemployment and the underemployment of their own members, and the serious wage cuts that came into operation in some coal areas as from Nov. 1, under the agreement which commits the wages of the miners to the control of economic circumstances. The Federation thought little of ultimate effects while flushed with the excitement of adventure in trying to secure something impracticable, and so it was not anticipated by them that the coal industry would be lowered to its present state. Now the Federation are exploring all avenues to save the pockets, without extending the hours and the output, of their members. There is nothing altruistic in the methods they have discovered. They desire that their own members should be let down as lightly as possible; and they want to see a revival in other industries, so as to create a larger demand for coal in order to increase the employment of the miners and improve the economic conditions of the coal industry. Exports are steadily moving upwards. But the mainstay of the coal industry is home trade; and it is in the home trade where things are so deplorable, and therefore demand for fuel at such a low level. The Federation want the balance of three millions of the ten million State subvention handed over to relieve further the miners' conditions, which they themselves have been so largely instrumental in producing. The Government have decided that the balance shall be retained by the Treasury; but this week pressure is going to be brought upon the Premier to secure a reversal of this decision. Seven millions sterling have already been expended in helping the miners to emerge from the morass created by their protracted strike; and the present position is worse than ever.

Now the other three millions is wanted for the miners; and on top of this, Mr. Frank Hodges, the Secretary of the Federation, has produced another fantastic scheme, which he thinks may improve matters. In this new idea, we get the same trend of tactics. As ever, what is required is help from others; but no suggestion of help from the miners, from whom it is possible for the greatest relief to come. The scheme produced by Mr. Hodges involves a financial subsidy from the Government to the extent of from 8 to 10 millions. This money it is proposed shall be devoted to assist in a trade revival, with the object of increasing the demand for coal, the price for which, it is suggested, should be put at 30s. per ton, including railway freightage. This shows an appreciation of the fact that industrial prosperity and coal demand go together, and that the prosperity of industry cannot be maintained with dear fuel. It is something gained to know there is cognizance of this in the high places in the counsels of the miners. But after all the proposal only means a further subsidizing of the miners' wages, and no suggestion of any contribution from them to trade revival by cheapening coal production. It also brings to mind the fact that not long ago, the Federation, "playing to the gallery," were urging a reduction in the price of domestic coal and not in that of industrial coal, and threatening the country with all sorts of pains and penalties if their plan of dealing with then surplus money was not carried out. Fresh reflections prevail to-day. Seven millions having been spent in subsidizing the miners, the trade position is worse than it was before the coal strike; and what would happen after Mr. Hodges' seven to ten millions had been exhausted? The position would be simply the same, without something better is done within the coal industry itself. Whence would the seven to ten millions of money come? It would come out of industry and through taxation. It would simply be a transfer from one pocket to another. The grim mistake is being nursed by the labour leaders that the sources of money are inexhaustible. There is 6s. less in a pound of interest on invested money after income-tax has been deducted, and of the remainder rates and other taxes absorb still more. This sort of thing cannot go on indefinitely, as there would soon be nothing left with which to carry-on. Without there is money to buy production, there can be no money with which to produce. It is no use frittering away more money in the manner now proposed by Mr. Hodges. A further suggestion has been made by Major Watts Morgan, M.P., also with the idea of assisting in the revival of the coal trade. On the face, this looks more acceptable; but, on deeper examination, the ultimate result does not show itself in material form, as the money has still to come from some source, which means industry. In this case the idea is that there should be a credit advance from the Government to the coal employers up to 10s. per ton, in order to facilitate the production of coal at a competitive price. For this purpose, it is suggested that £1,000,000 should be placed in the hands of the National Coal Board—the sum to be repaid at the end of twelve months. But here again this could only be a temporary expedient, and altogether would be opposed to economic conditions. It does not provide for any additional effort on the part of the miners in increasing production per man and per pound spent on wages.

The Miners' Federation are also appealing to the railway

companies and the dock authorities for a reduction of conveyance rates, so that the consumers of coal can get it at a cheaper rate. It must be admitted that the conveyance rates on top of the price of coal (especially the lower grades and slack) are against the purchase of these classes of fuel. Nevertheless, the best ways of increasing demand are by reduced prices brought about by increased production of coal per man and per pound spent on wages, and by fork instead of shovel filling, so that the consumers will get better value for money. Pits are still being closed-down, and for two reasons—one is that the production is so low that there is no profit in the working of the pits; and the other is that, through the use of the shovel, consumers are receiving coal from some pits more than others containing up to 30 p.ct. of incombustibles as against (say) the 12 p.ct. or less of pre-war times, and so are transferring custom to pits where they can get better value. These are matters for consideration and constructive action by the Miners' Federation. Changes in these conditions would greatly improve the position of their members. But they appear to be afraid to recognize these things and to press them. And these men who are afraid are the very men who supported and persisted in a three months' strike for something quite illusory, and which the best intelligences among them knew was a mistake, but at the time were afraid to say so, out of "loyalty" to those who were in the wrong, and "disloyalty" to that army of men who were being misled. None of the "fakes" so far proposed will restore the prosperity of the coal industry, and give full employment to more men. The Miners' Federation must go deeper, and must attack and remedy those conditions which will be of solid advantage. Restoration will only be effected by co-operation, and by both men and owners making sacrifices in a common cause.

Therm Price Reduction by the Gas Light and Coke Company.

Not only the consumers, but the proprietors, will learn with satisfaction of the decision of the Directors of the Gas Light and Coke Company to reduce the price of gas from 1s. 2d. to 1s. 1d. per therm as from the December quarter. South of the Thames the price will be lowered from 1s. 1·2d. to 1s. 1d. per therm. The reduction, the announcement says, will mean a saving to the consumers of at least £600,000 per annum. This will be gratifying; and the proprietors will be interested to learn at their February meeting what it will mean to them next June. Of course, in these times one cannot confidently predict what the profits will work-out to seven or eight months ahead; but it is clear the Directors have fair expectations. The information should have a good effect on the market values of the Company's stocks. We would suggest that gas undertakings that have become established on the therm basis should now drop comparisons as to price per 1000 c.ft., in view of the fact of the almost general lowering (contrasted with pre-war times) of the calorific value per cubic foot.

Gas Coal Position.

So far as gas coal is concerned, last week was uneventful in the different coal areas, with the one exception that in Northumberland and Durham there has been such a scarcity of trade and so much unprofitable working in connection with gas coals, that some collieries are reported to have stopped working. From Yorkshire, however, there are still reports of continued small accretions of demand; and deliveries on contract account are said to be getting more normal, though the stocks in hand are considerable. In some other districts, there is rather more doing owing to the increasing quantities carbonized to meet the growing winter demand for gas. Collieries producing inferior grades of coal are many of them in a sad mess through accumulation of unwanted surplus stocks. Speaking of stocks, it is stated that the railway companies, with the experiences before them of latter years, have put down reserves of dimensions exceeding those of pre-war times. Coke continues to enjoy a good market.

Old Prices and Therm Prices.

It is a very interesting contribution to our "Correspondence" columns that Mr. H. E. Jones makes to-day. He has been doing a little hunting among the old standard prices for gas and the new standard therm prices, in order to run to earth the relation the latter has to the former when reduced to the therm basis. But for discrepancies in the original prices in certain London and Suburban companies, it is seen that the additional figure per therm allowed is round about 7·5d.; and this proves how very uniformly the eight or nine companies were feeling the advanced costs of coal, labour, and materials. It also indicates that the standard price per therm has only risen by about 100 p.ct., while costs have bounded far and away ahead of that. Mr. Jones bears testimony to the care and discrimination that have been exercised by the Board of Trade in this regard. In a reference to the South Metropolitan Company's profit-division plan, our correspondent says it institutes "a sliding-scale which can never operate against the shareholder." When the charge per therm gets down to a low figure so allowing profits to be divided above the basic dividend of 5 or 6 p.ct. respectively on the old and new ordinary capital, and then a bad time comes and the price per therm has to be raised, Mr. Jones will find the proprietors heartily disagreeing with him that the system institutes a sliding-scale which can "never" operate against them. What the scheme does is to ensure a fair minimum dividend to the proprietors in any circumstances.

Meter Sizes and Legislation.

We see that, in one or two of the Acts passed this session, meters are described in the old manner as so many "light" meters. It would be well if parliamentary agents were advised, by one of the organizations concerned, as to the new standard sizes and descriptions of meters.

Until Electrical Works become Remunerative.

The electricity industry is back again at its old game. It wants the country to provide it with money for nothing for new works until they become remunerative. It was not long ago electrical men were asking for money on these easy terms for constructing works for the supply of more electrical power; the ostensible reason being that industry would develop if it had more cheap electrical power. But industry has been making a retrograde movement; and there is to-day more electric power in the country than is required. Now they are asking the Government for money on the same benevolent terms for the purpose of carrying-out works to help to minimize unemployment. A good many industries—gas among them—could provide more work if financial assistance was rendered until works became remunerative. The Committee to which we referred last week as having been organized for reviving electrical trade have had an interview with Sir Alfred Mond, and have laid before him their proposals. The Electrical Development Association indicate that these were well received by Sir Alfred; and it is anticipated that interesting developments may take place in a few days.

OBITUARY.

ALEXANDER BELL, OF PEEBLES.

By "J. W. N."

Widespread regret was felt throughout the Scottish gas profession on learning of the death of Mr. Alexander Bell, of Peebles, which occurred suddenly on Saturday morning, the 29th of October. Mr. Bell was found dead in bed; death being due to heart trouble. He was in his usual good health, and was anxious and vigorous at his work up to the last evening of his life. Born at Gibraltar, where his late father was Engineer and Manager of the gas-works, Mr. Bell was 57 years of age. He had served at his post at Peebles for the long period of thirty-four years—first under Company and for the past twenty years under Corporation control. He was responsible for the erection of the new gas-works opened in 1905.

Mr. Bell was not a man of ordinary instincts. His talents lay hidden. He shrunk from the platform and from the public gaze. If popularity to some men is sweetness and greatness, his way lay rather along the quiet path seeking and finding knowledge with the perceptive power of the student. His life's labour was placed in a comparatively small works, yet the whole of the gas industry to-day has knowledge of his work; and at an interesting time of evolution in the gas industry Peebles was the Mecca of gas men. He was the intimate associate of William Young, who undoubtedly directed and encouraged him in the scientific problems of gas manufacture. Mr. Bell was brought up in the shale-oil industry under Mr. Young at the Clippens Oil-Works; and at the early age of twenty-three, and at the wish of his friend, he proceeded from these works to be gas manager at Peebles in the year 1887. Before the North British Association in 1889, at Dunfermline, he read his first paper, entitled "Sulphur Compounds in Illuminating Mineral Oils," which was characterized by striking research. At

the Peebles Gas-Works the practical experimental work connected with the Peebles oil-gas process was carried out by Mr. Bell under the masterly tuition of Mr. Young. In 1893, at the Dundee meeting of the North British Association Mr. Young explained in a paper, "The Principles of the Production of Illuminating Gas from Liquid Hydrocarbons," in a style effusive of his intense knowledge of the subject. At the same meeting, Mr. Bell followed with a paper on "The Production of Illuminating Gas from Liquid Hydrocarbons by the Peebles Process," dealing with the practical results.

As has just been said, Mr. Bell's life lay amid quiet pastures. His memory will live among the many who knew him the best because of his modest manner and his truly upright character—a character, strangely enough, not modelled or fashioned by routine or academic up-bringing or by following rules common to ordinary men. His scientific tastes made him a thinker and a reader, and to some he appeared lonely. He had earned the approved respect of the community of Peebles.

The funeral was largely attended. The Provost, Magistrates, and Councillors walked in front; while places of business were closed as a mark of public feeling. Amid beautiful surroundings, near to the Tweed, with romantic Neidpath silent in its watch, he was laid to rest with a November autumn stealing in with its golden glory on the landscape of trees. Schoolmaster and pupil now lie near to one another; for William Young, of Priorsford and Harehope, is buried in the same cemetery.

We regret to announce the death, on the 4th inst., of Mr. JAMES SHAW, who for the past 27 years has been Manager of the Shelley and Shepley Gas Company, near Huddersfield. Mr. Shaw, who was 56 years of age, was the eldest son of the late Mr. David Stott Shaw, for over thirty years Manager to the Kirkburton Gas Light Company, near Huddersfield.

PERSONAL.

Mr. WALTER T. DUNN, the Secretary to the Institution of Gas Engineers, has been elected a member of the Council of the Chartered Institute of Secretaries.

Mr. J. FERGUSON BELL, of Derby, has again secured election to the Derby Town Council, upon which he has already rendered valuable service. He was heartily congratulated by his former colleagues in the Council on his success.

Mr. T. JOWETT has resigned the position of Secretary and Manager of the South Normanton and Blackwell Gas Company.

In connection with the recent Bolton municipal election, in which there were 55 candidates for 22 seats, Mr. JOSEPH TAYLOR was again returned unopposed.

Alderman J. H. LLOYD has been re-elected Chairman of the Birmingham Corporation Gas Committee. In a resolution of thanks to him for his services during the past year, special reference was made to his association with the department over the past thirty years.

Reduction of the Gas Light Company's Therm Prices.

The Directors of the Gas Light and Coke Company announce that the price of gas in the Company's district north of the Thames will be reduced from 1s. 2d. to 1s. 1d. per therm (a reduction equivalent to about 5d. per 1000 c.ft.) as from the date of recording the meter indices for the December quarter, 1921. This reduction means a saving to the Company's consumers of at least £600,000 per annum. The price in the Company's district south of the Thames will also be reduced—from 1s. 1·2d. to 1s. 1d. per therm.

In an interview with a Press representative last Saturday, the General Manager of the South Metropolitan Gas Company (Mr. F. M'Leod) stated that there was no immediate prospect of the Company reducing their present price of 11½d. per therm. The Company advanced their price by 1d. per therm after the coal strike, which cost them between £300,000 and £400,000. He added: "We increased our charge in order to overtake the loss. I do not suppose it will be overtaken this year; but out of consideration for our customers, we thought it inexpedient to impose a higher increase in order to overtake the loss in a short period."

Midland Association of Gas Engineers and Managers.—As already announced, the autumn general meeting of the Association will be held in the Grand Hotel, Birmingham, on Thursday of next week (the 17th inst.), at 2.30. Mr. W. E. Caton, of Oxford, will read a paper on the "Gas Regulation Act, 1920," in which he will offer some observations upon an application for an Order under section 1 of the Act, and the general procedure thereafter. The paper is on a subject which is of great interest at the present time; and to those officials of undertakings who are responsible for adopting the new method of charge under the Act, a cordial invitation to attend the meeting is given. Other business for the meeting includes the election of officers, and consideration of a suggestion for the formation of a benevolent fund.

GAS ACTS FOR 1921.

[THIRD ARTICLE.]

WE conclude to-day our survey of the Acts passed during the present session of Parliament. Those to be dealt with were reviewed in Bill form in our issues for Jan. 19 and 26 last.

The Bill of the SPENBOROUGH DISTRICT COUNCIL, it will be remembered, was converted to an application to the Board of Trade for an Order.

In their General Act the ST. HELENS CORPORATION have secured the right to charge, as from June 30 last, prices for gas not exceeding 6s. per 1000 c.ft., within the borough, and 6s. 6d. for gas supplied beyond the borough. Here, as in certain of the Acts reviewed last week, the Corporation have had a provision attached to this power which enacts that, within six months from the passing of the Act, they shall apply to the Board of Trade for an Order under section 1 of the Gas Regulation Act, 1920; and the Board may by such Order authorize them to charge a maximum price per therm corresponding as nearly as may be to the maximum price now authorized, without any addition in respect of increases in the cost of the production and supply of gas which have occurred between June 30, 1914, and Dec. 17, 1920. A clause appears regarding secondary products manufacture which limits the purchase by the Corporation from other undertakings to one-third of the quantity of the like residual arising from the manufacture of gas by them. There are various miscellaneous clauses, including one conferring the power to vary prices according to the purpose for which the gas is supplied. Another one amends the obligation to supply gas; and now the Corporation are not to be obliged to give from any main a supply of gas for any purpose, other than lighting or domestic use, in any case where the capacity of the main is insufficient for it, or if such supply would interfere with the sufficiency of the gas required to be supplied from the main for lighting purposes. [*Parliamentary Agents: Messrs. Sharpe, Pritchard, & Co.*]

The SWANSEA GAS COMPANY'S new Act deals primarily with the heat-unit basis of charging. The Bill was reviewed in our issue for Jan. 19 last. Originally the Company suggested that the declaration as to calorific value should be made within six months after the passing of the Act; but in the Act itself the period is reduced to three months. The clauses in the original Bill as to the minimum permissible pressure have been altered so that the terms in this respect of the Gas Regulation Act will apply, together with the addendum of the Board of Trade as to an increase to 2½ in. of the minimum permissible pressure when the calorific value declared is below 350 B.Th.U., and not below 300 B.Th.U. If the declared calorific value is below 300 B.Th.U., the minimum permissible pressure is to be such as shall be prescribed by the Gas Referees, but not less than 3 in. In the Bill, the Company proposed certain basic prices per therm; but these have been deleted from the Act. This now provides that the price of gas per therm supplied to ordinary consumers "(*a*) within the borough and within a distance of one mile thereof, and (*b*) at a greater distance than one mile from the borough," shall be such as the Board of Trade may fix by Order after giving the Corporation of Swansea an opportunity of being heard. In the Bill, the Company also proposed that the basic rates of dividend should be 6 p.ct. on the capital already issued, and 8 p.ct. on the capital issued after the passing of the Bill. These figures have now been altered respectively to 5 p.ct. and 7 p.ct. It will be remembered that the Company adopted the South Metropolitan plan of dealing with profits when the charges to consumers are below the basic price. In the Bill, however, it was suggested that the proprietors and the co-partners should be entitled in like shares "to a sum equal in the whole to one-half of the total sum by which the consumers benefited in each year, or half year by way of a reduction in the price or prices of gas supplied to them below the basic price or prices. "One-half" has been altered to "one-third," thus bringing the Company into line with the South Metropolitan precedent. The Company have secured the right to raise an additional £225,000 of capital; and in respect of borrowing powers the original proposals have been altered to any sum not exceeding in the whole one-half the amount of any capital, including premiums, authorized by the Act which at the the time of borrowing has been raised. Debenture stock and redeemable preference or debenture stock clauses appear, as well as reserve fund and special purposes fund powers on modern lines. Among a number of miscellaneous clauses is one which enables "the Company or the Directors to negotiate with any company carrying on a gas undertaking in any district contiguous, or near to, the limits of supply, or which may hereafter be established for the purpose, for the working, purchase, sale, lease, or amalgamation of the undertaking of any such company, and may defray the costs of, and incidental to, such negotiations, or of any valuation of such undertaking; and the Company may, with the consent of a majority of two-thirds of the shareholders of the Company, at a meeting specially convened for the purpose, subscribe towards the capital of, and take and hold shares in, or lend money to, any such Company." [*Parliamentary Agents: Messrs. R. W. Cooper & Sons.*]

The Act of the TENDRING HUNDRED WATER AND GAS COMPANY has been altered in several important particulars. The first proposal as to capital has not been changed. The power to create or issue further "A" or "B" shares conferred by section

56 of the Act of 1912 has been cancelled. But the Company may from time to time raise £91,120 19s. 5d.; being the unissued portion of the additional capital of £120,000, which they were by the section already quoted authorized to raise. In the clause "Limiting Profit on Ordinary Capital," it is enacted that the Company shall not in any year pay out of their profits any larger dividend on the preferred ordinary shares or the ordinary shares than at the rate of 8 p.ct., and on so much of the unissued additional capital authorized by the Act of 1912 as shall be issued as new ordinary shares than at the rate of 10 p.ct., unless a larger dividend be at any time necessary to make up the deficiency of any previous dividend which shall have fallen short of the maximum rate now authorized. Following this, we have a clause side-headed "Ranking of Ordinary Shares for Dividend." In this it is provided that the net profits of the Company are to be applied: (1) In payment of a dividend of 4½ p.ct. per annum in respect of the preferred ordinary shares. (2) In payment rateably of dividend at the rate of 4½ p.ct. per annum in respect of the ordinary shares, and at the rate of £5 12s. 6d. p.ct. per annum on so much of the unissued additional capital authorized by the Act of 1912 as shall be issued as new ordinary shares. (3) In payment rateably of dividends at the rate of 3½ p.ct. per annum in respect of the preferred ordinary shares and ordinary shares respectively, and at the rate of £4 7s. 6d. p.ct. per annum in respect of so much of the unissued additional capital authorized by the Act of 1912, as shall be issued as new ordinary shares. Concerning borrowing powers, the Company may now borrow sums not exceeding in the whole (inclusive of the sums of £39,550 and £40,000 of debenture stock created up to Dec. 31, 1920) the sum of £79,561 12s. 8d. Further, the Company may borrow any sums not exceeding in the whole one-half part of the amount of the unissued additional capital authorized by the Act of 1912 which at the time of borrowing has been raised under the powers of this Act. Sanction is given to the issue of preference shares and debenture stock as redeemable. Annual meetings are to be held. A clause appears respecting the new works; and this is accompanied by the one-third purchase limitation, in respect of secondary products. Following comes a clause which provides that the Company shall, within five years from the passing of the Act, or such further period as may be reasonable in any exceptional circumstances then prevailing, and as may be agreed upon with the Walton-on-the-Naze District Council, or as determined by an arbitrator, remove the existing gas-works from their present site in Walton-le-Soken, and so cease to manufacture gas or convert residual products on that site. There is a proviso that the Company are not to be prevented from maintaining, renewing, and using in its present position one of the existing gasholders. The Council are to have the option of purchasing the present site, except such land as is required for the gasholder referred to. Clauses are included for the protection of the Great Eastern Railway Company. A limit of five years is put on the construction of a line or lines of pipes in connection with the new works. Clauses referring to the heat-unit basis of supply follow. The period within which the Company are to declare the calorific value of their gas is six months from the passing of the Act. The pressures allowed for gas are in conformity with the Gas Regulation Act, with the additional pressure for declared values below 350 and 300 on the lines determined by the Board of Trade. Quite a number of sections in the Gas Regulation Act are cited; and then we arrive at the price per therm clause which has been altered from the original. The price is not to exceed 19 6d. per therm so long as the Company manufacture gas solely at their existing works at Walton-le-Soken; or, after they shall have commenced to manufacture gas at the new works, such price as the Board of Trade shall fix on the application of the Company or of any local authority in the limits of supply. In determining this price the Board of Trade are to take into consideration the cost which the Company have incurred in removing the existing gas-works to, and constructing the new works on, the described lands. Regarding prepayment gas-meter charges, these have not been altered from the figures quoted in the review of the Bill on Jan. 19. [*Parliamentary Agents: Messrs. Torr, Durnford, & Co.*]

The preamble of the Bill of the Thames Deep Water Wharf and Railway Company was not approved.

The "Waltham and Cheshunt Gas Company" is now the shortened title of the Waltham Abbey and Cheshunt Gas and Coke Company. As we stated when reviewing the Bill on Jan. 26, lands are scheduled on which the Company have secured the power to erect new gas-works. To the clauses authorizing this, the secondary products section in the now usual form is attached. In the Bill, the Company desired power to raise additional capital to the amount of £60,000, with one-third borrowing powers. The sum named has been reduced to £50,000. In a subsequent clause the limit of dividend on the authorized preference capital is removed; and hereafter any preference capital created by shares or stock will have a dividend attached at such rate as the Directors may determine at the time of issue. Preference or debenture stock may also be issued as redeemable. It is enacted that section 15 of the Order of 1881 shall be read and construed as if the words "£10 in respect of every £100 actually paid-up of the original capital" were substituted therein for the words "the rates of dividend prescribed by the Act of 1869 in respect of the original capital." Reserve and special purposes funds are provided for, as are also annual meetings in lieu of half-yearly ones. The novel form of stand-by clause to which reference was made when noticing the Bill on Jan. 26 has been allowed. A number of protective clauses succeed; and then come the provisions referring to profit-sharing—these being succeeded by various clauses of general application in modern gas legislation. [*Parliamentary Agents: Messrs. Sherwood & Co.*]

The Act of the Wandsworth, Wimbledon, and Epsom District Gas Company is barely more than the shadow of the original Bill, owing to the destruction of the scheme for the amalgamation of the Sutton Gas Company. The first clauses to be noticed are those providing for the repeal of section 55 of the Act of 1912, and the substitution therefor of a provision which enacts that the actual price to be charged for gas supplied within the Wimbledon limits shall not exceed by more than 1d. per therm, and within the Epsom limits by not more than 2½d. per therm, the price charged within the Wandsworth limits. This is followed by the provision that, if any increase shall at any time be found necessary in the price of gas, it shall be of the same amount throughout the whole of the limits of supply; and the same applies to any decrease that is made. A proviso to these changes is that, if at any time it is shown to the satisfaction of the Board of Trade that the costs and charges of, and incidental to, the production and supply of gas within the Wimbledon limits are not so much as 1d. per therm, and/or within the Epsom limits are not so much as 2½d. per therm, in excess of the cost of production and supply in the Wandsworth limits, the Board of Trade may on application by the Company authorize by Order such a decrease in the actual price charged for gas within the Wimbledon or Epsom limits, as the case may be, as will make the actual prices charged for gas in these limits not more than the actual amount of the excess in the cost of production and supply of gas in those limits respectively above the cost of production and supply in the Wandsworth limits. These provisions as to price appeared (when noticing the Bill on Jan. 26) in pence per 1000 c.ft.; but since then the Company have obtained their new Order putting them on the heat-unit basis. Hence the conversion to figures applying to the therm. There has been some change in the amount of additional capital to be authorized. This has been reduced to £289,478 13s. 8d., being the amount of the capital authorized by the Act of 1912, and remaining unissued. This capital when issued is to rank *pari passu* with, and is in all respects and for all purposes to be deemed to form part of, and to be consolidated with, the existing Wandsworth "A" stock; and it is to be entitled to a uniform dividend of 5 p.ct. per annum, subject to increase or decrease under the sliding-scale. Authority is given to borrow, including any sums already borrowed, an amount not exceeding in the whole one-half part of the capital for the time being issued. Works and secondary products powers are included in respect of land at Epsom. Protective clauses are given in favour of the Epsom District Council. [*Parliamentary Agents: Messrs. Lees & Co.*]

The section of the Act of the Wigan Corporation dealing with gas matters confers upon them the powers of specification for pipes between the gas mains and meters. Among the borrowing powers is a sum of £20,000 for gas mains, plant, and other purposes, with a repayment period of thirty years. Towards the end of the financial clauses, there is one which enables the Corporation, if they think fit, to apply money received by them on account of the revenue of any of the trading undertakings to the construction, extension, and improvement of the works, and other purposes of such undertakings, and in the provision of funds for working capital. It is, however, provided that the money shall only be so applied after working and establishment expenses of the undertaking, and interest and sinking fund payments in respect thereof, have been provided for. In the miscellaneous clauses is one providing for the use of silencers for internal combustion engines; and another having for its purpose the prevention of annoyance to the public by the ejection of steam and waste gases [*Parliamentary Agents: Messrs. Sharpe, Pritchard, & Co.*]

Meter Accuracy and Length of Service.

A long paper by Mr. C. R. Miller, of the Portland (Ore.) Gas and Coke Company, presented at the last annual meeting of the Pacific Coast Gas Association, was prepared with the object of showing that, though the question of accurate registration in connection with public gas regulations has heretofore been closely associated with the length of time that the gas-meter has been left in service, so far as the experience of his Company indicates there appears to be no necessary relationship between the accuracy of a meter and its period of service. As a matter of fact, a tabulation of 27,484 meters removed from service by the Company shows this. Their investigations lead them to believe that the findings of the modern meter-proving room are representative of conditions on consumers' premises; and that the average life of diaphragms is not materially affected on account of the location of a meter which is set in keeping with the modern interpretation of good practice, and not subjected to high temperatures. The author urged that a logical deduction would be that meters should be changed for cause rather than arbitrarily. The correct registration of meters is preferably attained by controlling the conditions under which they operate, rather than by frequent removals from service. Given the cost of repairing meters and changing meters, and assuming further that a progressive inaccuracy exists, it is possible by mathematical computation to indicate for these particular conditions the period of time during which a meter may be allowed to remain in service. The length of continuous service is contingent upon the life of its diaphragm.

ELECTRICITY SUPPLY MEMORANDA.

THE Electricity Commissioners' first annual report (which covers the inaugural period of fourteen months' operations to March 31 last) is a production extending to about a hundred pages of printed matter. They are busy men; and the demands on their time and energy have been great. They have had to develop a policy, too, in accordance with which they order their ways and frame their decisions. Their activities, of course, are not summed up by reorganization of generation for the country. This part of their work has a dead-end to it until Parliament condescends to pass a financial powers Bill for the Joint Authorities that are to be set-up. In addition to the heavy claims of reorganization, the Commissioners have been busy distributing sanctions to existing authorities mainly for the erection or extension of generating stations and transmission lines; but only where a bulk supply is not already available, and where there is a clear demand for electricity, will the Commissioners sanction expenditure for the establishment of a generating station. It seems, however, pretty clear that the schemes that have been sanctioned will go a long way towards meeting needs for some time to come. Out of 536 applications made for money for developments, it appears that 461 have now been dealt with—in 432 cases sanctions have been granted, and in 29 other cases there have been refusals. Sanctions were issued to 204 local authorities; the total amount of expenditure authorized in the fourteen months being £15,181,298, of which sum £9,805,920, or 64·6 p.ct., was for generating plant, and £3,428,161, or 22·6 p.ct., for distribution works. It is remarked that time and expense have been saved by the Commissioners using their practical experience in sanctioning loans when giving consent without holding a local inquiry, except in certain cases. This does not give opponents or ratepayers much chance of submitting their views on schemes and the fresh expenditure of money. The Commissioners have adopted a scale of redemption periods for the repayment of loans; but where plant is likely to be superseded by bulk supply or otherwise, the periods allowed for redemption may be reduced. The normal periods now applied are as follows

The Commissioners' Activities.

Land—	Years.
Freehold	60*
Leasehold (subject to duration of lease)	30
Substantial buildings	30
Plant and machinery	20
H.T. trunk transmission mains	40*
Overhead lines	25
Mains and services	25
Meters	10
Wiring of premises	10
Apparatus let on hire	7 to 10

* Scottish maximum period 30 years only.

The sanctioning of loans, however, is not apparently providing much work in the electricity industry. The manufacturers have been recently complaining bitterly of the small amount that is going; and various organizations connected with plant and apparatus manufacturing, labour, and sales development have been in conference to see what can be done to stimulate trade. They had a rare spurt in business during the war; but it has all died away now. Since the war available generating capacity has, we think, in many places swamped demand, which the slump in trade has further greatly reduced. It seems very much as though estimates as to requirements have been largely based on the flight of industrial demand during the war, when abnormal conditions prevailed. Up to 1914, the largest output in any one year, from the 500 generating stations in the United Kingdom was 2000 million units. During the war there was naturally a striking development of the application of electric power; and by 1918 the output in the country was advanced to 4628 million units. But much of this was of a transient character; and now there is stagnation in the electricity industry. It is interesting to note from the report that the income of the Commissioners for the period under review was £2526, of which £1120 represented fees on Special Orders, £1345 expenses of local inquiries recoverable, £56 sale of maps, and an odd £5 office charges recoverable. On the other side, salaries and wages amounted to £35,875, and office and other expenses to £7608—the excess of expenditure over income being £40,957.

New Attack on Gas Lighting.

The Electric Lamp Manufacturers' Association have started on a new campaign to enlarge the lighting field for electricity by annexing more gas-lighting territory. The Association make the claim that they are a body formed not only for the purpose of protecting the common interests of the members, but—and we do not question this—for the establishment of standards of quality, the encouragement of joint research, the equitable control of trade relations, and the promotion of electrical progress. The operations of the body are claimed to have been a direct stimulus to the spread of electric lighting; and the publicity work has reaped so much success that another national campaign is to be entered upon for this season. This fresh piece of activity is to arrest attention, to create a greater demand for electric lighting in the home, the office, the factory, and public buildings, and to secure the active co-operation of the electrical trade. Naturally, the lamps made by the constituent firms in the Association will be types that will be put forward as having no equal. We see from the notice in "Electrical Industries" of this new campaign that a map has been produced, called the "Electricity and Gas Map of Great Britain." Our contemporary says: "This gives the population, the numbers of gas consumers, and the numbers of electricity consumers in districts supplied with electricity. The disparity between the gas and electrical figures affords a powerful reminder of the immense field which has yet to be worked over in connection with electric lighting. There is perhaps a tendency to assume that, because electric light is now universally admitted to be superior to gas in every way, there is no need to push it aggressively. But when it is realized that electricity consumers are only a fraction of gas consumers, the folly of this inaction becomes apparent." There seems to be something wrong with this argument; for if superiority of electric lighting "in every way" is "universally" admitted, then there ought not to be that great disparity between the numbers of consumers of gas and electricity for lighting—a disparity which defines the number of electricity consumers as only a "fraction" of the number of gas consumers for this purpose. Anyway, the disclosures of the map must startle those know-alls in the electricity industry who have been so fond of rolling-off their tongues and pens that beautiful little piece of fallacy that gas for lighting purposes has become almost a thing of the past.

Factory and Shop Window Lighting.

We have seen that the associated makers of electric lamps are very busy with the opening stages of their new propaganda campaign. In August last, we also saw that the Departmental Committee on the Lighting of Factories and Workshops [see "JOURNAL" for Aug. 17, p. 370] had issued a report making certain recommendations regarding the lighting of workshops and factories. With some of their proposals, we were quite in accord; but with one of them, owing to the great divergence between the intrinsic brilliancy of electricity and gas lights, we were in disagreement. Over this particular point, and probably in relation to others, the Institution of Gas Engineers and the British Commercial Gas Association are keeping a very close watch, as otherwise it is quite probable that legislation might ensue which would be detrimental to gas, and unnecessarily so in view of the less intensity of a source of lighting provided by gas of equal candle power to a source of electric light. It is not only in regard to factory lighting that there should be some regulation of electric lighting, but in shop illumination. It should be made compulsory to shade these high intensity lights in order to protect the eyes of the public. The lighting position requires very close watching. However, passing from practical considerations to more or less ornamental ones, with a view to increasing the advertising value of artificial lighting, we must at once confess that for shop illumination gas undertakings have not shown any particularly fine initiative. In this connection, one of the latest suggestions enables the electric lighting of a shop window to give a tinted illumination, and a change of tint if desired day by day. Shopkeepers are constantly on the look-out for effective advertising media of this kind, although it is quite conceivable that tinted lights would be very inappropriate for shop windows in which it is necessary that the original colours of the goods or materials should be presented to the eyes of the public. Therefore, this latest suggestion will have limited application; but at any rate it is a novelty. It has been put forward by the British Thomson-Houston Company, Ltd.; and it consists of a device which surrounds the lamps—the top part acting as a reflector, and carrying at the bottom part a frame, slide, and the colour medium. The standard colours are red, amber, blue, and green; and a shopkeeper can have slides containing these colours, so that in the course of a few minutes he can, by changing the slides, vary the lighting tints in his shop windows. If our gas-lamp manufacturers have any novelties for intensifying the advertising value of gas lighting in shop windows, we shall be pleased to hear about them.

Keeping in Touch.

There is perhaps more occasion in connection with electricity than with gas for keeping in touch with consumers when new installations are made. We know that, in some electricity supply areas, when radiators or cookers are put in, within a few days an inspector of the undertaking pays a visit to see that all is running up to the mark. Of course, with an electric-cooker there are more seats of mishap than with a gas-cooker. There is practically nothing that can go wrong with the latter until a long time has elapsed, provided it is properly adjusted for the gas supply. With gas cooking, the chief thing that has to be guarded against is waste, especially with the boiling-rings. Now under the Gas Regulation Act, the obligation to adjust appliances and burners on a change of declared calorific value has been imposed; and with altering conditions of supply, it will be a wise policy to keep in closer personal touch with consumers. Though some electricity undertakings are good at doing this, the contrary is a marked failing with a greater number. The point as to want of interest in new consumers and their appliances has been raised in the columns of the "Electrical Review;" and, in a letter, Mr. E. G. Nicholson, of Woking, has outlined the practice of his Company in this regard. They recognize the necessity of "introducing" themselves to new consumers after they have had three or four weeks in which to settle-down. A letter of inquiry is sent as to whether the electricity supply is

giving satisfaction; and there is also reminder as to the "possibilities" of electricity for heating and cooking, as well as for lighting. This is followed up by, if desired, a representative of the Company calling. Concluding his letter, Mr. Nicholson remarks: "We have found that this inquiry frequently brings a response, often leading to further business; and we cannot but feel that it has the effect of creating the impression in the mind of the new consumer that his interests are, to some extent at least, the concern of the supply authority." We should like to see this "keeping in touch" become a common practice in the gas industry.

The Private Plant. The number of engineers is increasing who are of opinion that bulk electricity supply will never wipe-out the privately-owned electricity generating plant; for the latter is something that is becoming an integral part of a manufacturing establishment owing to internal circumstances, and the greater dependability there is upon such plants than upon a plant located a distance away. The dangers of interruption of service are not only in the generating plant itself, but the greater the distance from the source to the place of use, the greater the risk in distribution of a sudden cessation of supply. Manufacturers know what it is to be deprived suddenly of power and of the dislocation of work that is caused. Members of the Diesel Engine Users' Association have been talking about this in connection with a paper on the functions of the heavy oil-engine in connection with electricity supply. The gas industry is one source of heavy oils, and so (being also suppliers of gas for power purposes) is doubly interested in this question. In the discussion on the paper, there was a considerable difference of opinion with regard to the merits or demerits of various systems of providing for a supply of electricity in an area under varying conditions. It was, however, generally admitted that there could be no case for complete bulk supply—that is, for a system of supplying in bulk throughout the country—which would entirely eliminate local generating stations of comparatively small power, and that there was a very strong case for the installation of heavy oil-engine plant so long as a good supply of suitable liquid fuel could be ensured. A speaker who had experience in connection with about forty electricity supply undertakings equipped with Diesel engines, gas-engines, steam-engines, and steam-turbines, referred to the large number of cases in which no bulk supply could compete with the local generating station. He felt that bulk supply should be made use of wherever possible; and even perhaps in certain cases in which at the moment it might not be the most economical way to meet the immediate needs of an undertaking. But every case must be considered on its merits. He added that he had no doubt the Electricity Commissioners would be found to be approachable, and willing to hear all sides of any question of this sort; and he felt certain that, after the experience the Commissioners have obtained during the past year, they will now understand the many difficulties and limitations of bulk supply. Anyone with a good case for local extensions of generating plant will certainly get a fair hearing.

THE "BRENTFORD" COOKER.

THERE is generally something new to be seen on the works of the Brentford Gas Company—something which shows that those connected with the undertaking are not satisfied to go along with things as they are, but are always anxious to progress. Advance naturally follows upon this desire, as more than one reference in the pages of the "JOURNAL" during recent months has shown. Other things, besides those thus noticed, the writer saw on the occasion of a recent visit—the main object of which, however, was to make fuller acquaintance with a type of cooker that was the subject of two patents abstracted and illustrated in the "JOURNAL" for Sept. 7 last [pp. 546-7]. These patents—both taken out in the name of the Brentford Gas Company, coupled in one case with that of Mr. A. A. Johnston (the Engineer and Manager), and in the other with that of Mr. G. L. Jennings (the Deputy Chief Inspector)—relate to eminently practical inventions which have proved highly satisfactory in actual working. As a matter of fact, cookers arranged on the principles indicated in these patents have been in use on the district for many months now, with such good results that it has been decided to convert in their own workshops all the cookers as they come in, and these converted ones are at the present moment being put out on the district at the rate of between 300 and 400 a month. The alterations involved are not so great as is the difference effected in the working of the stoves.

CONTROL OF THE OVEN VENTILATION.

The principal feature of these new pattern cookers is the oven ventilation—the subject of Mr. Johnston's patent. Previously, this ventilation has been controlled by means of the flue outlet, the size and position of which has regulated the rate of escape of the products of combustion. The consequence has been that, owing to the construction and the fitting of the oven, the ventilation has always had to be regarded as an unknown factor. The Company found that this state of affairs did not promote the best working of the oven; and hence Mr. Johnston's invention of a system of control which is positive, and which consists of regulating the admission of air to the oven. This air is admitted just where it is required, through openings on each side of the lower part of the stove. With the exception of these openings, the bottom of the oven is sealed. The openings are arranged to permit the entrance of a certain definite amount of air—that is, the quantity required for the combustion of the gas being burned, together with the requisite surplus to give a reasonable margin of safety. The Company have experimented, and arrived at what is the right amount of air to allow. The openings would be of fixed size in cases where gas of known quality and pressure is to be used, but are regulated by adjustable shutters or valves when gas of different quality and pressure is supplied. The flue outlet, which is rectangular in shape, then becomes of no other importance than as a place for the emission of the products of combustion—it exercises no control over the air admission to the oven. Increased way is at the same time given to the products to pass through the inner crown of the oven.

From such an arrangement, various advantages might fairly be expected to accrue; and practical experience at Brentford has shown that the ovens give very considerably increased efficiency in cooking. Indeed, this increased efficiency is claimed by the Company to amount to no less than 40 p.ct. approximately. This efficiency is gained in several ways:

(*a*) The most perfect combustion of gas.
(*b*) The over-surplus of air is regulated; and the amount of cold air which has to be heated-up in the oven is reduced.
(*c*) Owing to the oven being closed at all places in the bottom, except where the air is admitted, the heating of the oven is more uniform.
(*d*) The air being taken in at the point of combustion, the flame is always burning in a pure atmosphere.

A query elicited the information that, with this oven, a temperature of about 800° can be quite comfortably obtained, with no more than a normal consumption of gas. Therefore for ordinary cooking purposes the supply of gas can be turned-down to (say) 10 to 15 c.ft. per hour. Furthermore, the new type of stove heats-up much more quickly than the ordinary pattern—complete heating taking place in about five minutes. Again, as all means of air entrance other than the provided orifices directly under the burners are closed, there is a larger proportion of the oven space available for cooking purposes. In the generality of gas-cookers the bottom of the oven, especially in the centre, is not available; but in the "Brentford" oven, with the front and back completely sealed, this portion of the oven becomes properly heated, and is available for cooking.

Another little point noticed about these new cookers is that the number of screws inside the oven is being kept down to the minimum; there being only four for the back and two sides. In the putting of the stoves together, this is found to save a great amount of time, besides being a convenience to the housewife when wiping out the interior of the oven.

THE ADJUSTABLE HOT-PLATE.

A further feature of the "Brentford" cooker is the adjustable hot-plate. In the usual type of cooker, the distance between the top burners and the hot-plate holding the vessel being heated is fixed; and owing to the varying compositions and pressures at which gas is supplied, the burners may be too near the vessel being heated (causing incomplete combustion, with its attendant objectionable smell), or too far away (with the resulting low efficiency). The overcoming of this difficulty is the object of Mr. Jennings' patent, in accordance with which the hot-plate is made separate from the top burners, and is fitted with a novel and simple adjustment by which the top can be raised or lowered at will to suit the flame which is produced by the burners under the conditions of combustion due to the composition and pressure of the gas actually being used. In this way, the best efficiency can be obtained from the burners.

When the stove is fitted, the hot-plate is adjusted in height to suit the gas composition and pressure conditions prevailing in a district, or particular part of a district; and should a change be made at any time in the gas supplied, alteration of the position of the hot-plate relative to the burners is an easy matter. There are brackets on either side of the crown plate, and arms depending from the hot-plate. These arms are secured in the proper position on the brackets—thus supporting the hot-plate at the required distance from the burners—by means of screws passing through slots and engaging with tapped holes; so all that has to be done is to loosen these screws.

As to the burners, it was noticed that these are fitted with screw-in nipples made in four standard sizes—one for each burner on the stove. If it should be found necessary to get more gas through any of the smaller burners, the fitter can put in a nipple with a larger-sized orifice, as all are interchangeable. These nipples cost practically nothing, and in this way offer means of adjustment of an extremely simple character.

With so many points advanced in its favour, it is hardly to be expected that the use of the cooker will be confined always to the district whose name is in this article applied to it.

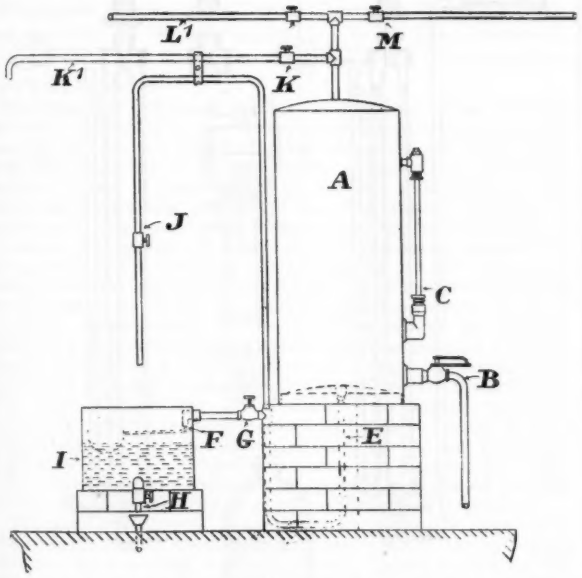
There will be a meeting to-morrow (Thursday) evening in the Council House, Birmingham, of the Midland Junior Gas Association, when Mr. F. Davis, Assistant Gas Engineer at Walsall, will give the members some "Observations on the Practice of Vertical Retorts." This will be followed, on Saturday, the 26th inst., by a visit to the Walsall Gas-Works.

A CONTINUOUS GAS SAMPLER FOR TESTING PURPOSES.

By BERNARD P. BEZANT, of Dartford.

WE are hearing much in these times about continuously recording calorimeters; but, as yet, other than for works' purposes, a recording calorimeter that will satisfy the Gas Referees for testing-station conditions and for penal purposes does not appear to be available. It occurs to the writer that—in view of the fact that the ordinary calorimeter will have to continue for a period at any rate to fulfil the functions of arbiter between the gas supplier and the consumer under section 1 of the Gas Regulation Act—insufficient attention has been given to the question of employing as an auxiliary a continuous sampler of gas, so that the tests made by the ordinary calorimeter may be of gas produced over a given number of hours—say, twenty-four.

The writer's attention was first called to the question of continuous gas sampling by the inconstant and misleading results obtained from spot-tests for the calorific value and inert constituents of gas. He therefore devised a simple and reliable form of sampler, so as to obtain an average sample of gas taken over (say) a period of twenty-four hours. The apparatus has been in daily use now for some considerable time, and has given satisfactory results. In the hope that the idea may be useful to others who have not considered the matter, a description and sketch of the apparatus is given.



A is an ordinary hot-water circulating tank of a capacity of approximately 30 gallons. This will give about 4·8 c.ft., which is sufficient for a calorimeter test, a sample for analysis, and specific gravity determination. B is the inlet-water pipe and valve connected to the main supply. C is a water-gauge for the purpose of ascertaining the volume of gas in the container A. E is a U-tube leading from the bottom of the container A to the controlling ball-cock F. The valve G is used only when repairs and adjustments of the ball-cock become necessary. H is the valve for regulating the amount of water running away from the ball-cock tank I. J is a pipe with a valve or cock in it leading from the U-tube E to the ball-cock tank I. K is a valve or cock on the safety overflow pipe K_1. L is the valve or cock on the gas-supply pipe L_1, leading from the container to the laboratory. M is the valve or cock on the gas-inlet pipe to the container.

The method of working the sampler is as follows: The valves H, L, and M are closed; the valves K, J, and G are opened; and finally the valve B on the water-inlet pipe is opened. As soon as the container A is full, a flow of water will be obtained from J into the ball-cock tank; also an overflow of water may be obtained from the safety overflow pipe K_1—that is, if the water is entering the container faster than the pipe J can take it away. This safety overflow pipe is fitted so as to make certain that no water flows into the pipe L_1, leading to the laboratory. As the tank is hardly ever completely run out, it is advisable to have ½ in. of oil on top of the water to prevent absorption of the gas. Very little of this oil, if any, need be wasted when filling the container, as water only will flow from the pipe J. But the oil will be lost out of the safety overflow-pipe K_1, if the water inlet-valve B is not closed instantly an overflow is obtained from the pipe J, indicating that the container is full of water. After the valves K and B have been closed, close valve J. Open valves M and K for (say) two minutes to clear the supply-pipe, then close valve K. The gas inlet-valve G is left open. The small cock H can then be opened and regulated.

As the head of water above cock H is kept constant by the ball-valve, the rate the water leaves the container is uniform, and not influenced by the head of water in the container, as would be the case if it were not automatically regulated by the ball-valve. Should all the water be displaced before the calculated time, there will be no escape of gas, as the limbs of the U-tube E are long enough to form an efficient seal.

When the container is full, or the required time has elapsed over which the average sample is to be taken, then close the valve M, and open L. Then crack the water-inlet valve B, so as to admit sufficient water to gradually fill the container, and so drive the gas out at the required speed.

It is necessary to have a governor fixed on the pipe L_1, with a pressure-gauge on either side of it. This greatly facilitates the adjustment of the water-inlet valve B.

If the whole of the gas is not used for testing purposes, the remainder can be forced out of the pipe K_1 until an overflow is obtained from the pipe J. The sampler is then left ready for use again.

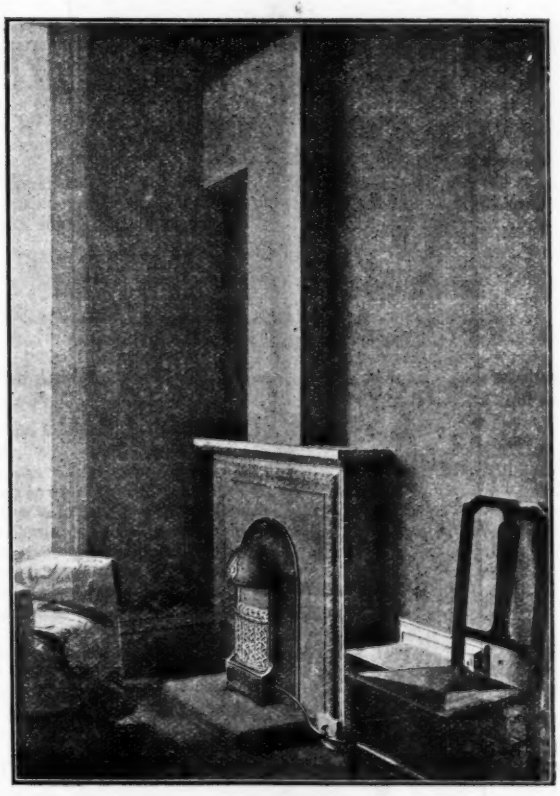
On most works the necessary parts can be found for the construction of this simple continuous gas sampler.

"NAUTILUS" FLUES AND GAS-FIRES.

In the Belgrave Hotel.

SOME few months ago, Messrs. Davies and Cross, the proprietors of many notable hotels and restaurants, acquired the Belgrave Mansions Hotel (which they subsequently re-named the Belgrave Hotel), in Grosvenor Street, W., and appointed Mr. Ernest Hand, architect, of No. 444, Strand, W.C., to carry out the reconstruction—their object being to open an extensive first-class hotel on modern lines near Victoria Station.

In the old building were a number of exceptionally large rooms quite unnecessary for the project they had in view. It was therefore decided to convert each large room into two rooms, by erecting fire-proof partitions. The problem of heating the second room in each case appeared a difficult one, on account of the absence of a chimney flue. The Nautilus Fire Company got into touch with the Architect, and invited him to their premises at No. 60, Oxford Street, W., where they showed him a full-sized model and architectural drawings of the "Nautilus" flue blocks, which resulted in their adoption. Some 200 gas-fires have now become a permanent fixture in the bedrooms. A small meter is fixed to each of the fires, enabling the visitor to have a warmed room for a few pence.



The accompanying illustration indicates the simple method of fixing the "Nautilus" flues. A concrete hearth was bedded down on the existing wood floor, against the wall or partition selected for the fire-place position. Upon this was erected the "Nautilus" flue, which, by means of a bend, was carried through the nearest external wall, terminating on the outer face of the building with the "Nautilus" eaves terminal. The gas-fire itself was placed upon a raised concrete hearth, and was fitted to a

reinforced fibrous plaster surround (which is a "Nautilus" speciality), with a simple deal moulding mitred round.

In this manner, the 200 rooms have been fitted up at a very low cost. There is no doubt the "Nautilus" cast-concrete flue will prove invaluable in the many cases of reconstruction upon which architects are now engaged; and every instance in which the system is adopted incidentally means a victory for gas.

THE "GREATER SURPRISE" GAS-PENDANT.

THERE has now been produced by Messrs. Best and Lloyd, Ltd., of Cambray Works, Handsworth, Birmingham, the makers of the well-known "Surprise" gas-pendant, a new pattern to which they have given the name of the "Greater Surprise."

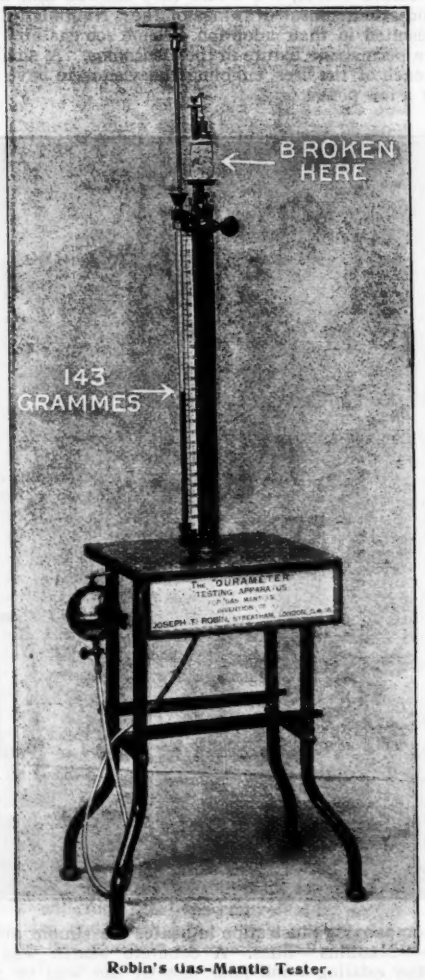
Like its prototype, the "Greater Surprise" has a rising-and-falling movement regulated on the equilibrium principle by means of balance-weights, and a radial movement which enables the light to swing round at some distance from the centre of the ceiling, and to be brought closer to the work in hand. In addition to these features, however, the new pendant has a central lift, so that it may be made to rise or fall quite centrally over (say) a dining-table placed in the middle of the room. Apart from its convenience, the central vertical lift gives the fitting, when so arranged, a perfectly symmetrical appearance. The change-over from the vertical to the radial, and *vice versa*, is instantly effected by drawing the pendant down and opening or closing the vertical tubes.

Provision is made for one or two inverted burners, and for a silk shade. The pendant is supplied in various neat patterns, and in all the usual styles of finish.

TESTING THE STRENGTH OF GAS-MANTLES.

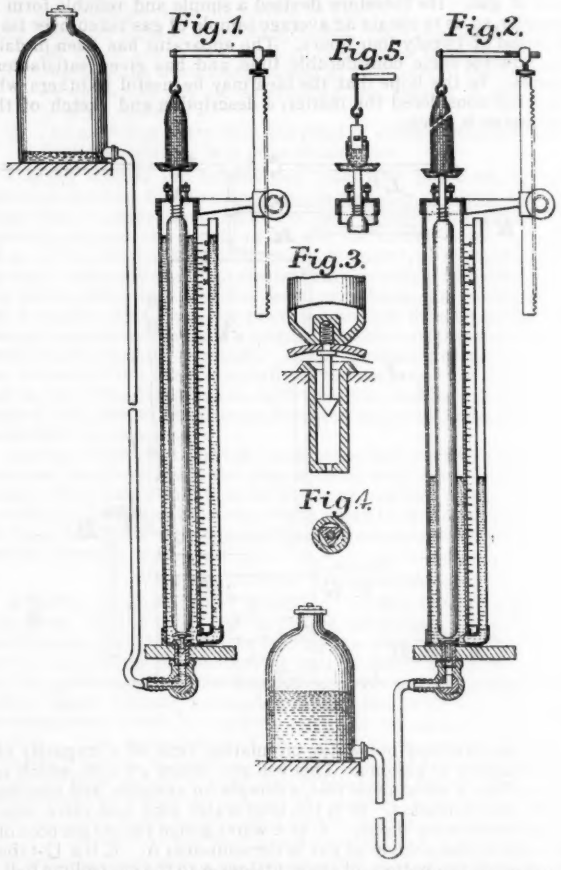
Robin's Patent.

LAST week there was sealed in the English Patent Office an application made by Mr. J. T. Robin, of Streatham, for "Improvements in or Relating to the Testing of Gas-Mantles and Other Articles or Materials."



Robin's Gas-Mantle Tester.

Pending the issue of the full specification of the invention by the Patent Office, Mr. Robin sends particulars as to the invention. As shown by the illustration the upper part of the mantle to be tested may be supported by its usual suspending means, such as the loop of an upright mantle or the supporting ring of an inverted mantle; and the circumference of the lower end of the mantle is immersed in melted wax contained in a pan or tray, so that when the wax is allowed to harden it becomes sealed or united to the lower end of the mantle—thereby affording the connection which enables the necessary pull or tension to be exerted on the mantle. The pan containing the wax is carried by a float vertically movable in a vessel or cylinder containing liquid; and, by allowing the liquid to escape from the cylinder, the float remains supported by the mantle through the connection afforded by the wax and the pan. Owing to the gradual escape of the liquid, the weight supported by the mantle increases from zero until the pull exerted on it by the increasing weight causes breakage, whereupon the float drops and traps the liquid remaining in the cylinder, by means of a valve on the lower end of the float closing the outlet of the cylinder. The weight which the mantle supported up to its breaking point is indicated on an adjacent scale, and represents the tensile strength of the mantle. With the object of testing several mantles simultaneously a number of similar testing units may be embodied in one apparatus; but the units operate independently, and thus enable the different tensile strengths of the several mantles to be determined.



Attached to the specification when issued will be two sheets of illustrations which further indicate the construction and working of the machine. Figs. 1 and 2 are diagrams showing the construction of the apparatus, and illustrate respectively the position of the parts before and after testing. Figs. 3 and 4 are enlarged detail views. Fig. 5 is a fragmentary view showing an adaptor or support for enabling an inverted mantle to be tested.

Books Received.—We have received from Messrs. Benn Bros. Ltd., No. 8, Bouverie Street, W.C. (and shall be reviewing in due course), copies of the second edition of Mr. Alwyne Meade's "Modern Gas-Works Practice," price 55s. net, and "Practical Chemistry of Coal," by Messrs. A. F. Findley and R. Wiggington, price 12s. 6d. net. Also from Messrs. Scott, Greenwood, & Son, No. 8, Broadway, Ludgate Hill, E.C., a copy of "Benzene and Mineral Lubricants; their Production, Testing, and Uses," by Dr. J. Formanek. This is translated from the German; and the price is 15s. net.

The Joint Committee of the Newcastle Section of the Society of Chemical Industry and of Armstrong College have arranged for a course of three lectures on "Chemical Works Organization," by Dr. W. B. Davidson, on Wednesday evenings Nov. 9, 23, and Dec. 7.

The opening meeting of the session of the Illuminating Engineering Society will take place on Tuesday evening of next week, the 15th inst., at the Society of Arts. Reports will be presented on progress during the vacation and developments in lamps and lighting appliances; and some interesting novelties will be exhibited.

NATIONAL GAS COUNCIL DISTRICT EXECUTIVE BOARD MEETINGS.

The annual meetings of the District Executive Boards of the National Gas Council have recently taken place; and by the courtesy of the Secretaries, we are able to give an indication of what transpired.

MIDLAND DISTRICT.

The annual meeting of the Midland District Executive Board took place in the Grand Hotel, Birmingham, last Thursday—Mr. Hubert Pooley, of Leicester, presiding. The report was adopted. Mr. James Paterson, of Cheltenham, was appointed Chairman for the ensuing year; and Mr. Pooley was thanked for the valuable services he had rendered. Mr. P. N. Langford, of Coventry, was appointed Vice-Chairman; and the retiring Management Committee were re-elected, with the addition of Mr. Pooley in place of Mr. Langford. Mr. Paterson was re-elected a district member to serve on the Central Executive Board. Mr. C. M. D. Belton, of Shrewsbury, was cordially thanked for his services as Hon. Secretary, and was re-elected.

Mr. E. J. Fottrell and Mr. S. S. Ogilvie, Joint Managers of the National Gas Council, briefly reviewed different sections of the work of the Council.

It was decided to arrange for quarterly meetings of the District Executive Board.

SCOTTISH DISTRICT.

The annual meeting of the District Executive Board for Scotland was held on Wednesday, Oct. 19, in the City Chambers, Glasgow—Mr. A. S. Legat (the Chairman of the Coatbridge Gas Company) presiding.

The report, which was adopted, dealt, among other matters, with the valuation of gas-works for assessment purposes, and the result of negotiations that had taken place with the local Land Valuation Assessors of Scotland in an endeavour to arrive at a uniform system of valuation of gas-works. This question was continued for further consideration. The report contained a reference to the recent coal dispute; and in this connection a statement was presented which showed the losses incurred to the gas industry in Scotland. In the case of 130 Scottish undertakings, the loss amounted to £365,000; and the probable total loss sustained by all the gas-works in Scotland would be about £450,000. With regard to the provision of gas for housing schemes, a deputation had appeared before the Scottish Board of Health to urge that the expenditure for main-pipes should be considered as a part of the capital expenditure for the schemes. This view, however, the Board declined to accept; but they stated that application by individual undertakings would be considered where special circumstances obtained. Under the recent legislation of the Gas Regulation Act, it was reported that only two undertakings in Scotland had applied for, and were granted, Orders—namely, the Stirling and Coatbridge Gas Companies.

The Gas Council have in force a scheme for the disposal of the products from gas-works to distillers, whereby the values are obtained by a neutral valuator, having regard to the market values of gas products. In this connection, as indicative of the loss sustained by the gas industry resulting from the low market price of these products, it was stated that, whereas in December the price for tar was 74s. 5½d. per 100 gallons, the rate was now reduced to 29s. 11d. Similarly in the case of ammonia liquid, for the same period the price had been reduced from 7s. 6d. to 11d. per 100 gallons. This depreciation in market values had resulted in serious loss to many gas-works, and was a factor in bringing about an increase in the price of gas.

Bailie Stewart (of the Edinburgh Gas Committee) was appointed Chairman, and Bailie Slorach (Gas Convener of Hamilton) Vice-Chairman for the ensuing year. Mr. J. W. Napier, of Alloa, was re-appointed Secretary.

SOUTH WALES DISTRICT.

The annual meeting was held on Monday, Oct. 24, when a large attendance of members was present.

The Secretary (Mr. W. Clark Jackson) read the report which was adopted. It showed that the membership during the year had been increased by nine (all company undertakings), making 54 in all. The matter of Model Bills and Clauses, 1919, was looked into very carefully by the Board, and several important amendments were sent forward to the National Executive, with the result that clauses which would have been detrimental to municipally-owned undertakings in particular were struck out. The Board rendered very valuable assistance to the gas undertakings in the district during the recent coal strike, when, through the Special Coal Sub-Committee, it was enabled to ensure regular supplies of gas coal being sent forward to various works, with the result that the gas supply to the public in South Wales was maintained during the whole of this most trying time. This certainly helped very considerably towards keeping the district free from disturbances. During the whole of the strike, the Board received all possible assistance from Mr. Finlay A. Gibson, the Director of Distribution, and his staff. The Special Coal Sub-Committee were able to obtain a reduction of 5s. per ton for gas-works coal from the agreed price as first arranged by the coal-owners; and during the latter period of the strike, they were able to arrange for an increased price of 10s. per ton being made generally applicable for gas-works coke. The Board have recently been giving a considerable amount of attention to organizing a scheme which will ensure the claims of gas being fully brought before the public in connection with the Welsh National Exhibition, to take place in Cardiff from May to October, 1922.

Mr. George Clarry was again elected Chairman of the District Executive Board. Several members spoke as to the splendid work which had been done by Mr. Clarry during the past year. Mr. J. E. Kenshole, of Merthyr Tydfil, was re-elected as Vice-Chairman. The Secretary reported that Mr. E. H. Swain had now resigned from the Management Committee, and that all the other members were eligible for re election. He also pointed out that, as the Chairman was an ex-officio member of the Management Committee, it would be in order to elect a further representative. Mr. H. Boucher, of Maesteg, was appointed in place of Mr. Swain, and Mr. J. Robb, of Chepstow, was elected an additional member. All the old members, except Mr. Swain, were re-elected. Mr. W. H. Johns, of Swansea, the retiring member, was re-elected representative on the Central Executive Board. Mr. Jackson, of Neath, was re-elected Secretary.

Messrs. E. J. Fottrell and Sholto S. Ogilvie, Joint Managers of the National Gas Council, were present, and gave short addresses covering the work done by the Council during the past year, and the work which still remained to be done during the ensuing year. Reference was made to the important position attained by the Council, in so far as they were now looked upon as the official mouthpiece of the gas industry by the various Government Departments, and also by other business and trade organizations.

Mr. W. M. Mason, of the British Commercial Gas Association, also gave a short address. He pointed out what the Association were doing for the industry, and what they were also prepared to do to assist in making the forthcoming Welsh National Exhibition a thorough success. Mr. Mason was appointed a member of the Special Sub-Committee of the South Wales District Board who are acting, along with Mr. O'Brien, the Secretary and Chief Executive Officer of the Welsh National Exhibition, in making various arrangements for gas at the exhibition.

SOUTH WESTERN AREA.

The meeting of the District Executive Board for the South Western area took place at Exeter on Tuesday, Oct. 25—Mr. G. Hardy Harris in the chair.

The Secretary (Mr. James Armstrong, of Ilfracombe) read the minutes of previous meetings, and they were confirmed. The report of the Management Committee was adopted; and the officials of the Central Executive Board were thanked for the assistance they had given to the gas industry generally, and the South Western District in particular.

The Management Committee were re-elected *en bloc*. Mr. Harris was re-appointed Chairman, Mr. P. S. Hoyte Vice-Chairman, Mr. Armstrong Hon. Secretary, and Mr. S. E. Halliwell representative on the Central Executive Board.

Mr. E. J. Fottrell, Joint Manager of the National Gas Council, explained in detail much of the work done by the Central Executive Board, and was thanked for his visit and the many helpful suggestions he had made.

FEDERATION OF GAS EMPLOYERS.

SOUTH-WESTERN DISTRICT COMMITTEE.

The Annual Meeting of the South-Western District Committee of the Federation of Gas Employers was held in the Gas Offices, Exeter, on Oct. 25, with Mr. P. S. Hoyte in the chair.

Mr. W. N. Westlake, in proposing the re-election of Mr. J. H. Ellis as Chairman, referred to the great interest Mr. Ellis had taken in the Federation work, which was exceedingly heavy, and to the valuable assistance and advice he had been able to give the Committee owing to his expert legal knowledge. Mr. Hoyte was re-elected Vice-Chairman; and Mr. J. Taylor, of the Gas-Works, Weston-super-Mare, Hon. Secretary. The following appointments were also made: Managing Committee: Messrs. R. Beynon, J. B. Cattle, F. O. O. Chubb, J. H. Cornish, C. G. Dawson, W. E. Dean, W. J. Imbrie, S. J. Ingram, J. E. Norman, R. Robertson, W. N. Westlake, and J. W. Whimster. Representatives on the Central Committee; Messrs. J. H. Ellis and R. Robertson (re-elected). Representatives on the Emergency Committee: Mr. J. H. Ellis (re-elected). Hon. Auditor: Mr. W. Blundell.

COMMITTEE FOR SCOTLAND.

The third annual meeting of the Federation of Gas Employers (Scottish Management Committee) was held in the Municipal Buildings, Glasgow, on Wednesday, Oct. 19, a large gathering being presided over by Mr. A. S. Legat, of Coatbridge.

The annual report and list of members were taken as read, and approved. The report showed, among other matters, that eight undertakings had joined, while two had resigned from membership of the Federation.

Mr. S. S. Ogilvie, Joint Manager of the Employers' Federation,

gave an account of the Federation's work for the past year, and answered questions regarding wages, &c.

The Management Committee appointed for 1921-22 was as follows—Chairman: Mr. A. S. Legat, of Coatbridge; Vice-Chairman: Mr. R. G. Slorach, of Hamilton. Members: Mr. G. Braidwood (Coatbridge), Mr. J. Dickson (Johnstone), Mr. H. H. Gracie (Edinburgh), Mr. T. W. Harper (Ayr), Mr. J. Keillor (Greenock), Mr. J. Lang (Alexandria), Mr. S. Milne (Aberdeen), Capt. J. C. Muirhead (Stirling), Bailie W. Muirhead (Falkirk), Mr. J. W. Napier (Alloa), Mr. D. Vass (Perth), and Mr. A. Yuill (Dundee). Secretary: Mr. G. Braidwood, of Coatbridge. Representative on the Executive Committee of the National Joint Industrial Council for the Gas Industry: Mr. G. Braidwood.

SOUTH WALES DISTRICT COMMITTEE.

The third annual meeting of the Committee was held in the Gas Offices, Cardiff, on Monday, Oct. 24—Alderman H. Morgan, C.B.E., J.P., in the chair.

Alderman Morgan was re-elected Chairman of the Committee, and Mr. J. H. Canning, O.B.E., Vice-Chairman. The following were elected as the Management Committee for the ensuing year: Alderman H. Morgan (Neath), Councillor D. Davies (Porthcawl), Messrs. J. H. Canning (Newport), T. E. Franklin (Barry), J. E. Kenshole (Merthyr Tydfil), W. H. Johns (Swansea), A. H. Brookman (Tenby), T. C. Kirk (Pembroke), A. T. Kyle (Abergavenny), L. Murray (Blaina), S. Murray (Aberkenfig), and H. Barker (Llanelly). Mr. J. H. Canning was re-elected a member of the Central Committee of the Federation; and Mr. Octavius Thomas, of Pentre, was re-appointed Secretary.

THE DEVELOPMENT OF GAS MANUFACTURE.

By J. HERBERT CANNING, F.C.S.

Before the Local Section of the Society of Chemical Industry, at Cardiff, last Friday, Mr. J. Herbert Canning, F.C.S., Engineer and Manager to the Newport (Mon.) Gas Company, read a paper on the "Development of Gas Manufacture," in which he confined himself to that aspect of the question likely to be of the greatest interest to the members.

Touching briefly upon the earliest days of the industry, he pointed out that the primary and fundamental process of gas manufacture is that of the destructive distillation of coal. This operation may also be termed a critical one, as no subsequent treatment can modify to any material extent the volume or quality of the resultant gas. Hence it is of the utmost importance that this operation should be carried out with the greatest efficiency possible. In his early experiments, Murdoch carbonized the coal in a cylindrical iron pot, the top of which was closed by an iron cover—the gas being led away by a side pipe. The difficulty of removing the coke from such a vessel was obvious, and as early as 1802 he had adopted a horizontal form of retort. But he appeared also to have experimented with an inclined retort placed at an angle of about 45°. Murdoch realized at a very early period the importance of high temperature in carbonization; but at the same time the deterioration of the gas produced, due to its prolonged passage through the incandescent coke, led several experimenters to adopt the method of carbonizing the coal in thin layers, and eventually the problem was solved by the introduction of the oblong and ⌂ form of retort. By the year 1841 the use of oval, ⌂-shaped, or circular retorts of the horizontal type, placed in settings of five or thereabouts, had become practically universal. Fireclay retorts were not generally adopted until well after the middle of the Nineteenth Century. Subsequently, the advantages of regenerative firing became apparent; and this method of heating retorts is now practically universal. The wider scope afforded by these various developments led naturally to a period of research and experiment which can hardly be said to have reached finality.

Development has proceeded generally along three lines. In the first place, the possibilities of the horizontal retort have been increased enormously by the use of stoking machinery and careful attention to the details of design and working; and modern practice tends in the direction of filling the retort and allowing a more prolonged carbonizing period. About 1885 Coze re-introduced the inclined retort, which had previously been experimented upon by Murdoch; and this type has been used extensively. It is obvious, however, that there are few advantages to be obtained by means of the inclined retort which cannot be quite as effectively secured by the utilization of the vertical retort; and as a result the extension of this type has been to a great extent checked. But it has been developed in the form of the chamber setting which was first adopted in 1901 at the Munich Gas-Works. This type of setting has not hitherto been extensively adopted in Great Britain. The German coals carbonize more rapidly than the English coals; and this would naturally place the chamber setting at a disadvantage in this country. The most important development which has taken place in recent years with respect to carbonizing processes is the re-introduction of the vertical retort, first introduced by John Brunton, in 1828. This and other early attempts proved failures, until in 1902 Messrs. Settle and Padfield, of Exeter, erected a semi-vertical retort with a continuous feed, the coke being withdrawn at intervals. In Germany at the same period development proceeded on similar lines.

Mr. Canning then traced the evolution of the vertical retort, and referred to steaming, which brought him to a fourth development of gas manufacture in recent years—the making of water gas. The other departments of gas manufacture were briefly reviewed, where these present points of interest to chemists. The Burkheiser and Feld methods of purification were indicated; and then the author dealt with the all-important question of thermal efficiency. He said that, in this respect, the processes of gasification employed on gas-works can not only compare most favourably with the other methods of treating coal for the production of energy; but when one takes into account the very valuable products recovered, it may be said there is no other process which so fully renders available for general use the thermal and economic value of the coal employed. Carbonizing efficiencies of from 80 to over 84 p.ct. have been realized in actual working; and it may generally be said that a total thermal efficiency of 75 p.ct. is pretty generally obtained at the present day. This can be still further increased by the adoption of the most modern apparatus and the installation of waste-heat boilers. General indications point to the fact that in the future development will tend in the direction of the complete gasification of coal and other fuels. The best method of effecting this is at present a moot point, which nothing but investigation, followed by practical trial, can determine; and, even so, the conditions under which gas supply is carried on are so diverse that the process which is highly economical in one locality may not necessarily be the most advantageous under conditions obtaining in another district.

In conclusion, Mr. Canning quoted the following figures as showing the vigour and vitality of the gas industry:

—	1891.	1911.	Increase Per Cent.
Total number of statutory gas undertakings	602	822	36·1
Capital employed	£63,620,462	£136,097,928	113·1
Gas sold, c.ft.	99,869,805,000	189,046,549,000	89·3
Number of consumers	2,353,037	6,649,904	182·6
Public lamps	475,084	728,548	53·3

Blue Water Gas in the Hydraulic Main.

At the annual convention of the Michigan Gas Association, Mr. S. W. Cheney, of Grand Rapids, stated that his Company had made a substantial saving last winter by the introduction of blue gas into the hydraulic main, thus picking-up and retaining certain rich constituents which would otherwise be carried away by the tar and gas liquors. At Grand Rapids, the hydraulic main is divided into three sections of five benches each, with foul main offtakes at the end of each section. The blue gas is divided and put into each section of the hydraulic main at the ends opposite the offtakes, so that it must flow the full length of the section, and become thoroughly mixed with the hot gases in the hydraulic. It is quite important that the gases be mixed hot, as experiments have demonstrated that blue gas is better able to pick-up and retain the enricher at the higher temperature. In order to determine how much blue gas could be introduced without affecting the heating value of the coal gas, eight-hour tests were run, where the heating value of the gas was tested every fifteen minutes, and a percentage of blue gas, different in each test, was introduced during alternate periods between charges. These periods varied from one hour forty minutes to two hours, depending upon the number of charges that day. By introducing the blue gas during alternate periods, they were better enabled to determine just what effect it had on the heat value. Two tests during which 8 p.ct. and 12 p.ct. respectively of blue gas were introduced had no effect on the quality of the mixture; but in the next test, when 16 p.ct. was used, the heat value during the alternate periods was noticeably reduced. This would indicate that at somewhere between 12 and 16 p.ct. the limit of blue gas is reached, unless it is desired to use it as a diluent. This process can be employed in any plant manufacturing both coal and water gas, and having a spare storage holder or a good-sized relief holder.

The Coalfields of Iowa.—It is estimated that the available coal supply of Iowa is still considerably over 28,000,000,000 tons; but according to a report by the Bureau of Mines, the coal mines of Iowa have a smaller output than the average throughout the United States. Because of the irregularity of the beds, the mines are comparatively short-lived; the average life being not more than ten or twelve years. Iowa coal cakes in a fire; and it is not in any sense a coking coal. It does not coke in a beehive oven; while in a retort-oven or a gas-retort, it makes a friable, porous coke, which contains too much ash and sulphur to be valuable as a metallurgical coke. Nor is the outlook promising for making a good domestic coke, in view of the fact that the many Illinois coals make a better domestic coke, and show less loss of volatile matter. In general, Iowa coal weathers rapidly on exposure, and hence does not store well; and if there is much slack present, it soon takes fire spontaneously.

LOW-TEMPERATURE CARBONIZATION AT BARNSLEY.

Report by Sir Percy Girouard, K.C.M.G.

In the "JOURNAL" for Oct. 26, we gave a general account of a visit paid to the works of Low-Temperature Carbonization, Ltd., at Barugh, near Barnsley, for the purpose of inspecting new plant now in use for the manufacture of smokeless fuel. It will be remembered that in this article mention was made of the fact that the firm of Messrs. Close Bros. and Co., Ltd., and their friends, have taken over the operation of the works, and that important developments and improvements have been made in the plant.

On Oct. 18, Messrs. T. M. Davidson and R. H. S. Abbott submitted to Messrs. Close Bros. and Co. a report upon the process, in the course of which they are very complimentary regarding the operation of the new carbonizing plant, including the plates which form a feature of the retorts as described in the article in our columns already alluded to. Allusion is also made in their report to a test on 833 tons of coal. The figures resulting are as follows:

Yields Estimated, 1919.

Coalite. 70 p.ct.	1,568 lbs.
Tar	16 gallons.
Benzole	2 gallons.
Sulphate of ammonia	12 lbs.

Yields Actually Obtained, 1921.

Coalite, 72 p.ct.	1,612 lbs.
Tar	17 gallons.
Benzole	Not yet tested.
Sulphate of ammonia	Not yet tested.

There is nothing upon which remark need be made in connection with these figures. It is, however, clear that the reporters did not desire to take credit for anything resulting from the process which they have not actually achieved in working. Among other things, they admit that very little is known at the present time about the value of low-temperature tar, and suggest that the whole proposition is one for exploration and research. Unluckily, according to the report, nearly all chemists analyze and fractionate the low-temperature tar by the rules and methods employed in connection with high-temperature tar. They comment on the fact that "it is difficult to find a chemist with an original mind who is capable of working with his nose off his book."

Coming now to the report by Sir Percy Girouard, it is noted that this gentleman entered upon his investigation of the system if anything somewhat prejudiced by the technical history attaching to the process; but on an invitation to report being extended to him, he gave his time and services gratuitously, "in a desire to put to the proof, and test in the national interests, the claim of science and engineering to have discovered a method by which small coal or slack might yield new economic wealth." Passing over the preliminary part of the report, he alludes to the installation of twenty retorts said to be capable of carbonizing 200 tons per week. This leads him to refer to the device of a pair of collapsing plates, which divide the coal charge into two halves. These plates, it will be recollected, are perforated; and means are provided by which they are enabled readily to collapse. On collapsing after carbonization of the slack, it was anticipated that the coalite would drop into a cooling chamber below; that during the period of carbonization the gases given off from the coal would readily escape through the orifices in the plates, and not have to force themselves through a mass of hot coal occupying the whole retort; and that the device would give a larger yield both of gas and of tar oils.

The tests which Sir Percy followed are those referring to the 833 tons alluded to above. With these tests, the devices have had a very severe trial; and, according to him, they have gone through it with great success—more particularly in the circumstances of starting a new plant. He does not hesitate to comment upon defects in the auxiliary plant. For instance, the washing appliances, he says, were not, and are not now, by any means perfect; and the fuel is therefore at times admitted to the retorts with too high a degree of moisture. Other mechanical defects revealed themselves from time to time; but they were all capable of explanation and perfection. The plates acted exactly as was expected—the collapsing taking place with precision, and allowing of the discharge of the carbonized material with "almost" unfailing regularity. The yield of tar oils has exceeded anticipations.

Another improvement is in the method of dealing with the coalite on its being discharged. The old plan gave the material a bad appearance, and led to the formation of a great deal of breeze. Now the coalite is discharged into an enclosed cooler surrounded by water; and after a due period the cooler itself is emptied, when the coalite is found to be in a "hard, compact form, containing not more than 5 p.ct. of breeze." It is stated by Sir Percy that so durable is the material as now produced, that it suffers very little in transport. Another change is in the mixing of the more expensive caking slacks, for the purpose of forming a binder for the greater proportion of non-caking slack. The proportion of the latter now being used is about 70 p.ct. This course is found to be highly desirable from the financial point of view.

The report goes on to deal with the bye-products. The motor spirits are said to amount to about 3 gallons, of a specific gravity which would apparently place them somewhere between petrol and benzole. The tar oil, as a whole, burns readily. It can be fractionated into Diesel oil, lubricating oil, and cresylics, all having a high potential value. On distillation, apparently 50 p.ct. of the tar oil yields will be pitch, which in itself is more than likely to contain material of high commercial value. Ten tons of tar oils are now being fractionated at a high-temperature tar distillery, and the results will shortly be available; but "as it took many years of careful research to determine the values of high-temperature tar, it is too much to expect that low-temperature tar oils have as yet been fully analyzed."

Sir Percy indicates that, in his view, the figures taken in the estimates as to the expenditure and the values of the bye-products have been on a conservative basis. In conclusion, he is persuaded that the working of the twenty retorts at Barugh, continuously and progressively up-to-date, is not only a great step in advance in low-temperature carbonization, but has provided all the data necessary on a commercial scale to warrant Messrs. Close placing the information they now have available before any interested countries or enterprises. It has provided the certainty of the manufacture from slacks of a smokeless transportable fuel of even a higher value than the best domestic coal. He feels that the whole industry, if developed on the lines now initiated "would appear to be one of paramount national importance."

AMERICAN GAS ASSOCIATION.

More Annual Convention Papers.

To those already published, we are now able to add the following abstracts of reports and papers prepared for the Convention of the American Gas Association.

Work on Purification.

In a report on the "Effect of Moisture on the Activity and Capacity of Iron Oxides for Gas Purification," by Mr. W. A. Dunkley, of the Bureau of Mines, is described work which was performed through the initiative of the Illinois Gas Association, and under a co-operative agreement between the Bureau of Mines, the Illinois State Geological Survey, and the Engineering Experiment Station of the University of Illinois. A full account of this work will be found in the "JOURNAL" for Aug. 17, 24, and 31 last.

The Purification Committee—whose Chairman is Mr. A. C. Fieldner, Supervising Chemist to the Bureau of Mines—report upon the results they have accomplished. Since iron oxide purification is of the most general interest to the gas industry, the Committee have confined their attention in the matter of research to the development of a programme dealing with the fundamentals of this process. Sub-Committee III., on the activity and capacity of iron oxides (under the chairmanship of Mr. Dunkley), was expanded to include practically the entire Committee.

It was generally recognized that iron oxides have at least two different properties, which together determine their usefulness for gas purification purposes—namely, activity and capacity. Two different methods have been suggested for measuring activity. The first of these is a modification of the Kunberger test, proposed by Mr. Dunkley, in which a gram of the oxide is subjected to an excess of pure hydrogen sulphide for a period of one minute. The activity is expressed by the percentage of hydrogen sulphide absorbed per unit weight of ferric oxide. The second method is based on a determination of the maximum flow of a dilute mixture of hydrogen sulphide in an inert gas, at which a standard quantity of the unfouled oxide removes the hydrogen sulphide completely. As the preliminary work on the second method had only just been completed at the time of writing the report, it has not been possible to submit it to the Committee for criticism and trial; but the results obtained were felt to be sufficiently promising to warrant a brief description of the work (which is given by Dr. A. R. Powell as an appendix to the report), in order that the next Purification Committee may give the method due consideration. Full details of the work on the first method—the one-minute fouling test proposed by Mr. Dunkley—are given in another appendix to the report. It was tried-out by seven different members of the Committee on a series of six standard oxide samples. The agreement of the different laboratories in the order of activity of the oxides was fairly good; and it is believed that a further standardization of the exact method for carrying out the test will make the agreement much better.

Neither of the two activity tests referred to above is proposed as a complete test for the valuation of oxides. The tests are designed with the single purpose of indicating the particular property of activity or speed of the sulphiding reaction in comparing fresh material. They think it probable that the rate-of-flow method can also be employed to indicate the progressive decrease in activity at various stages of the fouling. An important use of activity tests is in studying the effects of variable conditions—such as temperature, acidity, alkalinity, and catalysts. Complete evaluation of an oxide for gas purification must include the determination of other properties in addition to activity and capacity, though these two may prove to be the most important.

Continuous Inventory of Fixed Capital.

The Committee appointed by the Association to investigate this matter define a "continuous inventory of fixed capital" as a

record of the physical units of plant and property, in conjunction with the financial record of construction expenditures, kept in such detail as to set forth clearly the identity and location of each unit, and of each item of cost. It may be described as a continuous record showing a complete description of each item of construction expenditure comparable with the ledger record of cost, and compiled with the same thoroughness. It should be in such form as to enable an engineer to identify it readily with the physical property. A continuous inventory may originate with an analysis of the actual expenditures as shown by the books, verified with the physical property, resulting in an inventory in balance with the ledger figures of fixed capital, or may originate with an inventory and valuation made independently of the books of account. The former the Committee believe to be the more desirable method when it is possible, as it provides a detailed record of the property which may be used for all purposes involving original costs, and may also serve for purposes of reproduction value by the application of present prices. It is doubtful, however, whether the conditions and records make such an analysis possible in the case of more than a comparatively few companies. Replies to questions addressed to companies making a million cubic feet or more gas daily, indicate that an overwhelming majority recognize the importance and advantages of such a record.

Some objections have been made to the continuous inventory on account of the expense involved; but once it is available, it should prove more economical over a period of years than the large expenditure necessary in the preparation of valuations at recurring intervals. The experience of those companies who have adopted the continuous inventory leads the Committee to think that the difficulties of maintaining the record are more apparent than real; and that the expense of keeping the inventory, after it has been started, may become a comparatively small item when it is properly co ordinated with the accounting methods in use. It has been found from the experience of some of the larger companies that the yearly cost of this work is not more than $300 or $400.

Industrial Fuel Sales.

The report of the Industrial Fuel Sales Committee declares that years of experience in the industrial fuel business leave no doubt that the average manufacturer, using large quantities of fuel, will eventually have to use gas, no matter where he gets it. Intensive methods of production that characterize modern industry demand of him that he should use a fuel of flexibility, such as gas only provides. Inability to obtain this fuel from a central station will force him to seek the best process by which he can make the fuel himself. Every industrial plant that has had experience with fuel oil, coal, coke, or even electricity in the past will ultimately be a gas user, whether this be supplied from the central station or manufactured on the premises. "We find, therefore," say the Committee, "that the apparent great obstacle—namely, the acceptance of our product as a desirable fuel—has long been overcome. The future for our business is no longer a matter of advertising, publicity, acquainting the manufacturer with the value of our product, or anything of that sort. The present and future of our business lies in the solution of a more material factor—the reduction of the cost of our product to the consumer."

The gas industry is, in the opinion of the Committee, continually losing its biggest and most profitable customers because of the fact that the price is not right. The tendency of its large industrial customers, instead of being on the increase, is rather towards a slow and gradual decrease in number. All this means that if central station gas is to become a successful industrial fuel, it must compete on a basis of cost with other available fuels. The basis of competitive cost is also important. The comparison of gas with other fuels is not to be made on a basis of pounds, cubic feet, or even heat value. The manufacturer is interested in the cost of the different fuels on the basis of a unit of plant production. The fuel that will melt a pound of metal, or treat a pound of steel, at the lowest cost, is the fuel the industrial consumer will purchase. The cost of fuel per unit of production is therefore the proper basis of fuel cost comparison.

With the thought in mind that, if the price of central station gas is right, every industry using fuel becomes a prospect to whom this gas can be sold, the Committee have endeavoured to analyze the problem and segregate the factors which affect the cost of gas per unit of finished product, and by this means offer constructive suggestions to help the industry in overcoming the present difficulties. The three principal factors of which the cost of central station gas per unit of finished product are made up are: The cost of manufacturing gas; the manner in which are segregated the costs of supplying the service, which forms the basis of industrial rates; and the efficiency with which the gaseous fuel is applied and utilized. The Committee urge that a scale of rates must be adopted which will charge the domestic consumer in proportion to his expense of the service, and the industrial consumer likewise. The present system, whereby the domestic consumer is undercharged and the industrial consumer overcharged, is "unreasonable, and above all suicidal." The gas company should sell the industrial consumer gas at cost, *plus* a fair return on the plant investment. The subject of efficient fuel utilization is only in its infancy; and all gas companies will be well repaid by giving more time and study to the efficient utilization of industrial gas. The use of recuperators and regenerators is one of the most practical and effective means of saving fuel and lowering the fuel costs per unit of production. Given proper attention to this subject, the following comparative data are results of actual practical operations, and represent the amounts of other fuels which can be displaced by central station gas.

1,000,000 B.Th.U. of town's gas
will displace any one of these—
1,050,000 to 1,500,000 B.Th.U. of natural gas.
8 to 14 gallons of fuel oil—1,100,000 to 2,000,000 B.Th.U.
1,500,000 to 2,000,000 B.Th.U. of coal fired in the producer.
1,500,000 to 4,000,000 B.Th.U. of coal or coke used in the solid form.

The suggestion is made that this matter can be satisfactorily handled by a Committee appointed by the American Gas Association, who would have charge of a research laboratory supported by the member companies of the Association. This research must be undertaken by men who can give their entire time to the work.

As to the cost of making gas, the Committee say that the present position is most encouraging. "Several processes are being developed, both in this country and abroad, which indicate the recovery of large amounts of tar and ammonia and in the neighbourhood of 20,000,000 B.Th.U. of a high-quality gas per ton of coal. Most of these, it seems, are a combination of low-temperature carbonization of coal with the manufacture of water gas from the resultant coke. The gas obtained is a mixture of coal gas and water gas, and varies in value from 300 to 400 B.Th.U. Developments of this kind should be of the greatest interest to all gas men. It really seems as if we can now look with certainty to the realization of our hopes for the future of our business. We can now look forward to the practical development within the decade of a process of gas manufacture that will yield, from a ton of bituminous coal, 5 to 15 lbs. of ammonia, 15 to 20 gallons of coal tar, and from 18,000,000 to 22,000,000 B.Th.U. of gas. Such a system will obviously be highly efficient, and will produce British thermal units at such low cost that our central station gas will be able to enter all competitive fuel markets."

The Committee go on to say that developments of more efficient gas manufacturing methods are valueless unless the present ridiculous standards regulating gas supply can be got rid of. "There is absolutely no justification or even sanity in legislation which continues to force our utilities to supply a gas of certain British thermal unit value which is more expensive to manufacture and of no greater value than a gas which can be readily manufactured at a lower cost. Of course, we are making progress along these lines. Some of our municipalities have been able to get down the calorific value of the gas from 600 to 425 B.Th.U. This progress, however, rather than representing the majority of our companies, represents the attitude and enlightenment of only a very few of our State Commissions. This problem, like the rest, can only be successfully met by all our companies organizing themselves into one body, and taking the problem as a national issue. The present gas standards are absolutely unnecessary and antiquated, and should be abolished. There is no reason why any company should be hampered by any regulation regarding the British thermal unit value of the gas, within certain limits. If we really wish to learn a lesson, and realize what can be done along these lines, we need only to look into the experience and happenings in England. . . . Let us profit by England's experience, and remove the shackles which have kept our proper development and prosperity in bondage. Let us enact legislation that will allow us to give all customers the best service at the lowest cost."

MANCHESTER AND DISTRICT JUNIOR GAS ASSOCIATION.

Visit to the Works of West's Gas Improvement Company, Ltd.

On Saturday last, members of the Association, to the number of a hundred, assembled in the general offices of West's Gas Improvement Company, Ltd., of Manchester; and after a few words of welcome, the party was divided into groups and then conducted over the extensive works.

The following is only a brief survey of the ground covered. The first department to be visited was the production department. In this office, charts were shown giving the time work should take for each contract, commencing at the drawing office, followed by the shops, and then the erection. There were charts for each individual contract, showing the actual progress of the work, steel-work charts, charts showing actual time taken with the work, charts showing goods ordered out, goods delivered, &c., &c. This department was something never to be forgotten. It was easy to see from the charts displayed the actual progress of all the work that was being done, whether on an individual contract or on the whole of the contracts held by the Company. In the drawing office, drawings of all kinds were displayed; and the drawing stores, laboratory, and print room and technical library were also seen. In the progress stores, all the mechanical parts are inspected and checked. The machine shops, drop-forging department, and smithy were also seen—several men being at work. The structural steel department is laid out in four bays, and is equipped with five overhead cranes and all the most modern machinery. The hydraulic press, mouthpiece shop, brass foundry, fitting shop, and chain-fitting shop were all seen and

admired; and it was clear to all that the chart they had seen in the office was very easy of accomplishment. The chart read as follows:

TWELVE MONTHS' WORK.

Structural steel, 4800 tons.
Machinery, 4000 tons.
Refractory material, 6½ million bricks—150 different shapes and three grades.

TEA AND A CINEMATOGRAPH.

Tea was provided and served in the general office; and while at tea opportunity was taken to make a flash-light photograph of the party.

Mr. FRANK WEST, responding to the call of the President, said that the firm was established in 1874. They started with manual stoking machines, then passed on to coal and coke handling machinery—being the first to successfully introduce this plant into gas-works. Following on, came the power stoking machinery, and then vertical retorts, in the year 1905. The present number of employees was about 1100; while the employees at their silica works (Derbyshire) numbered some 200. The number of contracts completed since the armistice was 16, and equalled 572 retorts. They had further contracts in hand which would bring the number of retorts up to 1708. The firm were the pioneers in the successful application of "steaming" in continuous vertical retorts; and no plant had been subjected to such rigorous public examination. In the future, development in the direction of more complete gasification, for which their plant was being adapted, was to be expected.

Mr. F. B. SMALL (Liverpool) moved a vote of thanks to the following gentlemen who had entertained them and conducted them round the works: Alderman Fred. J. West, M.I.Mech.E., General Manager and Director (now abroad on business), Mr. Frank West (Director), Mr. Ernest West (Assistant General Manager), Mr. P. C. Shapley, Assoc.M.I.Mech.E. (Works Manager), Mr. J. W. Curtis, M.B.E., Assoc.M.I Mech.E. (Chief of Progress Department), Mr. T. A. Tomlinson, M.B.E., M.I.Mech.E. (Engineer to the Firm), Mr. R. J. H. Sayers, M.I.Mech.E. (London Manager), Mr. Allchin (Outside Department), and Mr. Ronald B. Glover, Assoc M.I.Mech.E., all of whom had assisted to make the visit so very instructive and helpful.

Mr. GOODIER (Runcorn) seconded, and spoke in high terms of the efficiency obtained by reason of the charts, &c.

Mr. T. DUXBURY (Oldham), in a racy speech, supported the motion.

Mr. E. WEST, on behalf of the firm, replied to the vote of thanks, and suggested that the Association should pay a visit to their silica works in Derbyshire during the next summer.

NEW MEMBERS.

The following new members were duly welcomsd: Messrs. G. E. H. Keillor (Blackburn), J. E. Holliday (Blackburn), J. E. Dixon (Manchester) A. K. Collinge (Preston), F. H. Fifield (Great Harwood), O. P. Cronshaw (Great Harwood), E. Burke (Accrington), and A. Haslam (Bolton).

THE COMPANY'S CINEMATOGRAPH.

After a short interval the party were shown the Company's cinematograph.

Film No. 1 showed Glover-West retorts under construction, and continuous carbonization vertical retorts under actual working conditions; and film No. 2, views of the Company's works at Miles Platting, and of the works of the Derbyshire Silica Firebrick Company, depicting the special silica material being made for use in the construction of Glover-West vertical retorts.

The meeting concluded with a vote of thanks to the operator.

SULPHURIC ACID FROM SULPHATES.

From the "Chemical Trade Journal."

For the manufacture of sulphuric acid, the lead-chamber process and the contact process are the ones most commonly employed. Attempts have been made, however, especially during the war, to remedy the shortage of pyrites by utilizing those minerals found more abundantly in Nature—such as calcium sulphate or gypsum—and the Badische Anilin und Soda Fabrik have prepared from this latter product enormous quantities of ammonium sulphate.

HYDROGEN-SULPHIDE PROCESSES.

Several years previous to the war, states an abstract in "L'Engrais" of an article in "La Nature," the Chemische Fabrik d'Hönnigen utilized the Hans furnace to obtain sulphur by the oxidation of hydrogen sulphide. It was found that the oxidation went far beyond the stage of sulphur, and that sulphuric acid could be obtained. This process was studied and exploited during the war. The hydrogen sulphide necessary was obtained from black ash; and to effect this, two processes were available. First, the Schaffner and Helbig process, which consisted in allowing magnesium chloride to react with the calcium sulphide, according to the equation—

$$CaS + MgCl_2 + H_2O = CaCl_2 + H_2S + MgO;$$

and, secondly, the Chance and Claus process, which consists in acting upon the calcium sulphide with carbon dioxide in high concentration.

The manufacture of sulphuric acid by means of hydrogen sulphide can be carried out, for example, by allowing H_2S to react with copper sulphate solution, when insoluble copper sulphide is precipitated and sulphuric acid enters into the solution, from which it can be prepared by decantation, filtration, and concentration. The copper sulphide is then introduced into rotating cylinders heated to 300° C., and submitted to an oxidation regulated in such a manner that the copper sulphate necessary for another cycle is regenerated. To obtain a satisfactory result with this oxidation, however, it is necessary to add to the sulphide two or three times its weight of copper oxide.

FELD POLYTHIONATE PROCESS.

Certain furnace gases contain up to 2 p.ct. of sulphur dioxide—a concentration too low to be dealt with satisfactorily by the usual lead-chamber process. They should be treated, however, to recover the sulphur as such, as sulphur dioxide, or as sulphuric acid. This gas, poor in SO_2, is, by the Feld process, washed with a solution of sodium thiosulphate. Polythionates of sodium are obtained, which can be treated to produce sodium sulphate, sulphur, and concentrated sulphur dioxide. The polythionates obtained in solution are the tri-, tetra-, and penta-thionates—

$$2\ Na_2S_2O_3 + 3\ SO_2 = Na_2S_3O_6 + Na_2S_4O_6;$$
$$4\ Na_2S_2O_3 + 6\ SO_2 = 3\ Na_2S_2O_6 + Na_2S_5O_6.$$

By means of live steam, these solutions are heated to 90° to 100° C., when decompositions, as expressed by the following equations, occur:

$$Na_2S_3O_6 + Na_2S_4O_6 = 2\ Na_2SO_4 + 2\ SO_2 + 3\ S;$$
$$3\ Na_2S_3O_6 + Na_2S_5O_6 = 4\ Na_2SO_4 + 4\ SO_2 + 6\ S.$$

The hydrogen sulphide of illuminating gas can be recuperated in an analogous manner; the gas being washed with a solution of ammonium tetrathionate. The hydrogen sulphide is absorbed, as well as the ammonia, forming ammonium sulphate, ammonium thiosulphate, and free sulphur. Boiling a solution containing ammonium thiosulphate and ammonium tetrathionate gives ammonium sulphate and also sulphur dioxide and sulphur, which, reacting upon the thiosulphate, regenerates the tetrathionate, which is thus available for a further purification process. By assuming 1 p.ct. as the average sulphur content of coal, it has been calculated that in the case of Germany alone, the gas-works and coke-ovens would be able to extract 140,000 tons of hydrogen sulphide, or 130,000 tons of sulphur, per annum; and that the amount of pyrites imported into Germany could be reduced by 300,000 tons. The Badische Company, in order to fix in the form of sulphate the enormous quantities of ammonia produced by the Haber process, have employed the polythionate process on the large scale; but they have particularly devoted their attention to the production of sulphuric acid from gypsum.

PRODUCTION FROM GYPSUM.

Ammonium sulphate can be obtained by treating gypsum with ammonium carbonate; and this process was patented in France in 1910 by the Société Industrielle des Produits Chimiques. To work it, ammoniacal liquor may be treated with carbon dioxide and gypsum in suspension added to the carbonated solution. The solubility of calcium sulphate in water is low enough; but seeing that, in proportion as the reaction proceeds, the particles in solution are decomposed and precipitated, the solution is effected continuously and at a sufficiently rapid rate, provided that the reacting mixture be kept warm and constantly maintained in suspension by means of mechanical agitation. A modification of the above procedure consists in introducing ammonia and carbonic acid gases, simultaneously, into an aqueous suspension of calcium sulphate. In order to obviate the costly evaporation operation, and to obtain final solutions of high concentration, very thick emulsions of calcium sulphate must be used. A third method of operating the process is to pour into the gypsum suspension a concentrated aqueous solution of ammonia, while a current of carbon dioxide gas is also passed through. A saturated solution of ammonium sulphate of 5 cubic metres volume is treated with a current of ammonia gas until about 4·5 grammes of ammonia per 100 c.c. of solution have been dissolved. The free ammonia is then neutralized by a current of carbon dioxide. In a vessel provided with mechanical agitation, the liquor, maintained at 40° to 50° C., is treated with 1050 kilos. of gypsum. At the end of six to eight hours, the temperature is raised to 80° C., and the liquor filtered and cooled to 20° C., so as to allow of the crystallization of the ammonium sulphate. The yield is about 575 kilos. of dry sulphate; and the mother liquors are re-utilized. The separation of the ammonium sulphate solution from the fine calcium carbonate mud is the most difficult operation of the process; filter presses and vacuum filters giving unsatisfactory results. The Badische Anilin Fabrik recommend the use of suction plunging filters.

The same firm have also made large-scale experiments in the manufacture of free sulphuric acid from gypsum, but have not been able to obtain very satisfactory results. Some interesting suggestions on the point have, however, been made. M. Basset, for example, utilizes the sulphuric acid of calcium sulphate for the direct preparation of superphosphate. He first of all prepares ammonium sulphate by the double decomposition described above, and then carries out the reaction between this sulphate and tricalcium phosphate in a boiler with mechanical agitation. The heating of the mixture to 400° C., under the influence of a current of carbon dioxide, gives pyrophosphate or metaphosphate of lime, with the liberation of ammonia and steam.

Alderman Michael Tomkinson, of Franche Hall, Kidderminster, seven times Mayor of the town, and a Director of the Kidderminster Gas Company, left net personalty £135,967.

SCOTTISH JUNIOR GAS ASSOCIATION.

(EASTERN DISTRICT.)

Opening Meeting at Edinburgh.

The opening meeting of the Scottish Junior Gas Association (Eastern District) was held on Saturday, Oct. 21, in the Heriot Watt College. There was a large attendance; a good number of senior gas managers being present.

Mr. CAMPBELL (Anstruther), the retiring President, thanked the members for their support during the past session, and hoped they would continue to co-operate with the new President and Council to carry on the good work of the Association. He had much pleasure in calling on Mr. A. M'Donald, of Prestonpans, to take the chair.

Mr. M'DONALD thanked the members for the honour conferred on him in electing him as their President. His first duty was to present the medal to the retiring President (Mr. Campbell); and he wished him many long years to wear it.

Mr. CAMPBELL suitably replied.

The PRESIDENT then delivered an address on

RUNNING A GAS-WORKS ON ALL-TULLY GAS.

It is difficult to find a subject for my address; but I think a general outline of my career, and some results from experience gained in running a gas-works on all Tully gas, will interest you.

My early training was that of an official in the distribution department of a large works, and as such I did not come much in contact with the manufacturing side of the business. There was little chance of gaining much knowledge by experience, unless you had a desire to do so. After twelve years of gas-fitting, the desire to learn more of the business got hold of me; and with the help of Brooke and Alwyn Meade, along with visits to various gas-works, in my spare time, I thought I had gained sufficient knowledge to qualify me for some of the gas managers and assistants jobs advertised.

However, committees and directors do not value that sort of knowledge, and want actual practical experience. When a chance to take control of a ¾ million gas-works came my way, I took it, even though it meant a sacrifice in wages and a lot of hard work. But here was my chance; and I took it. The works had been for sale for three months, and was closed-down when I was installed. I was handed the keys and directed to the works, and told to get on with the job. The works consisted of two beds—one bed with two retorts in little bits, and another bed with one retort in not so little bits. One of the retorts, however, was held together with carbon in large pieces. The first job was to see which bed was the best; and on examination I found this to be the single retort. So I cleaned off the carbon, which took about a day, got inside and patched it up with chunks of brick and fire cement until it was like new.

I proceeded to heat the chimney by taking-out the bricks from the clearing door and kindling at the base a fire of old tar-barrels. This done, I proceeded to heat-up the retorts for making gas. After two days, getting a fair heat, I charged-up; but, to my dismay, the meter would not move, and all the gas was blazing out of the cracks in the retort. This was most annoying, and as further patching was of no use, and night was coming on, I left it till morning—in fact, I felt like leaving it altogether. However, the next day, with the help of another member of our Association (Mr. M'Intyre, of Montrose), I was able to make better progress. In our investigations, we discovered the hydraulic main full of solid pitch, which was removed with red-hot rods and buckets of red-hot coke. The inlet and outlet of the condensers were choked, as also were three columns of the condensers. The communicating pipes between the two purifiers were water-logged, and no means of clearing them, other than syphoning with the mouth, were available.

The outlet of the purifiers was also water-logged, and, last of all, the meter drum was stuck fast. I overcame most of the trouble bit by bit; and as the meter had no bye-pass, I had to work through the meter dry for the first month, until one day, when I had a big stock of gas in the holder (2500 c.ft.), I took off the front and cleaned-out the sludge. This done, the meter went away beautifully. For the first month my make of gas was about 4000 c.ft. per ton, and the highest reached was 9600 c.ft. per ton, although I was told that my predecessor had as high as 10,600 c.ft. His stock of coal, however, was sometimes 40 tons short on an annual make of about 700,000 or 800,000 c.ft. I must say that, in spite of all the hard work involved, the experience gained was very valuable; and it was such experience that I required.

About this time, when struggling on with this small concern from early morn till late at night to make somewhere about 3000 c.ft. of gas, my attention was drawn to an article describing a system at Kingscliffe, where a boy was making about 10,000 c.ft. from 8 a.m. to 5 p.m., and knocking-off for dinner and having Sunday off. This created a keen desire to do likewise. Having this in mind, on coming to Prestonpans and finding a scheme of reconstruction necessary, I got into communication with the boy, who put me in touch with the makers of the plant. I obtained plans and particulars, which were placed before my Directors, who being practical gas engineers wisely ordered a duplicate plant, twice the capacity of the one I had recommended. This foresight on the part of my Board enabled us not only to carry on during the recent coal strike, but to continue to send out all Tully gas, as we are so successfully doing to-day.

It is not my intention again to describe the Tully gas plant, as this would be merely repetition of other able members, but rather to give my experience and some data as to the distribution of this gas alone to the consumers, without admixture with coal gas. At the start I was doubtful as to the advisability of the project; but circumstances forced me to do so, or shut-down the works. So on Sunday, April 17, I made the plunge, and have kept on swimming ever since. I expected to be overwhelmed with complaints; but happily this was not the case. With 1200 consumers, our average number of complaints was about six per day. When starting on Tully gas, we reached a maximum of sixteen per day for a short period, which gradually reduced itself until now there is only about one per day. These complaints were only a matter of burner adjustments, and in most cases the mere closing of the air regulator settled the complaint. Once the adjustment is made, no further complaints are received, and the consumers are perfectly satisfied with the supply they are getting. This applies to all classes of apparatus, whether for lighting, heating, cooking, or power. It will be of interest to you to know what the various gas appliances are consuming.

Boiling Burner Tests—Quart Domestic Pot.

—	Rate per Hour.	Time to Boil from 56° Fahr.	Gas Consumed.	Pressure.
	C.Ft.	Minutes.	C.Ft.	In.
Main "ace" burners	30	6	2·75	32/10ths
" " "	24	6	2·48	32/10ths
Wright burners . .	18	8¼	2·75	27/10ths
Main ordinary ring .	20	8½	3·50	27/10ths

Burner Tests.

—	Rate per Hour.	Pressure.
	Cubic Feet.	
Bray No. 3	4·8	25/10
" No. 2	3·2	20/10
Bijou	2·2	15/10
Upright	7·2	37/10

Gas-Engine Tests.

10 H.P. "National" 28 hours per week using 5200 c.ft. or 185·7 c.ft. per hour at an average of 35 amps. 100 volts = 18·5 c.ft. H.P.

The gas is an unvarying quality of about 375 B.Th.U. The coal used is Preston Links treble nuts, with a yield on an average of about 37,000 c.ft. per ton, with a maximum of about 49,580 c.ft. This is exclusive of boiler fuel, which in our case is rather heavy; the boiler being of an old Cornish type, working at a steam pressure of only 20 lbs. This is most inefficient for the economical running of the plant. However, this will soon be remedied, and with higher steam pressure, and a more efficient steam generator plant, very much better results will be obtained.

My idea as to why Tully gas has been found equally economical in the hands of the ordinary consumer as straight coal gas is the fact that with Tully gas the flame is shorter and more intense, and that with the ordinary gas apparatus the gas is consumed before coming into contact with the vessel to be boiled, and the full heating value of the gas is obtained. The late Prof. Vivian B. Lewes, in his book on "Liquid and Gaseous Fuels," in the chapter on the use of "Coal Gas for Heating and Power," tells us all we wish to know about flame. The most important point of all is where he points out that when water is heated or boiled in an open vessel the temperature cannot rise above 100° C.; and as the temperature of an ordinary flame is over 1600° C., it is evident that the burning gas can never be in contact with the bottom of the vessel. Or, in other words, the gas is put out before combustion is complete, and the unburnt products of combustion find their way into the air. Prof. Lewes goes on to state that the hottest zone is supposed to be about ½-inch above the inner cone of the flame; and it is at this point that most vessels containing water to be heated are made to impinge on the flame. It is this portion of the flame also which is utilized for raising various solids to a temperature at which they will radiate heat. To prove the importance of this, he goes on to give an analysis of the waste gases escaping during checked combustion—in one case, ½-inch above the inner cone of the flame; and in the second, at the extreme outer tip of the flame.

Bunsen Flame.

—	Inner Cone.	Outer Cone.
Nitrogen	75·75	79·17
Water vapour	13·47	14·29
Carbon dioxide	2·99	5·15
Carbon monoxide	3·69	*Nil*
Methane	0·51	0·31
Acetylene	0·04	*Nil*
Hydrogen	3·55	0·47
	100·00	100·00

This is of the greatest importance indeed, and proves conclusively that the extreme top of the bunsen flame is the only portion which can be used for heating a solid substance without liberating deleterious gases.

Prof. Lewes further states that the best forms of geyser and other heaters of water in quantity are those in which the combustion of the flame is completed out of contact with the surface to be heated. The whole principle of the efficiency of the combustion of gas rests on these few important facts. No doubt the maximum efficiency will be obtained from the gas-oven where the gas does not impinge upon anything, resulting in complete combustion. The same efficiency can be obtained from a ring-burner so long as only the very tip of the flame comes in contact with the vessel to be heated; and this is the secret of the success of straight Tully gas—*i.e.*, that the full duty is obtained owing to the short intensely hot flame.

The same efficiency is obtained with Tully gas in the incandescent burner by cutting-out the primary air; the flame depending mostly upon the outer air for aeration, with the result that a very intense flame is obtained in contact with the mantle. The efficiency and economy of Tully gas in the case of the incandescent burner is due to the fact that the only regulation necessary is done by the consumer every time he lights it, by adjusting the tap, obtaining thereby the maximum luminosity with the minimum consumption of gas. After considering these few points, is there any wonder that the consumer finds this gas economical? One can easily imagine what labour, trouble, and waste can be saved by abolishing the bunsen burner and depending entirely on the external aeration of the flame. This, of course, is only a matter of burner construction; and it is for the stove manufacturers to give this matter the attention it merits.

The success of the Pleno burner depends upon complete combustion of flame out of immediate contact with the vessel to be heated; and any burner can be made as economical if these simple rules are observed. Inerts in ordinary gas tend to lengthen the flame, with the result that more of the flame is in contact with the vessel to be heated—less perfect combustion being obtained and gas wasted. This important (and the latest) work of the late Prof. Lewes is worthy of careful study, as it will explain many things that are of the greatest value at the present time. It should be our duty and policy to give the consumer the best value we can in therms. This can only be done by making the most out of the coal with the minimum of labour. A good yield with a coal-gas plant is approximately 12,000 c.ft. of about 500 B.Th.U. gas. Allowing for 10 cwt. of coke, say, 12 million B.Th.U. per ton are obtained. With Tully gas, after allowing for steam for boiler and motive power, we get well over 14 million B.Th.U. and only a fraction of the labour cost, no coke sales to bother about, less coal to handle, and no capital in the shape of coal stocks lying idle. There is no doubt whatever that the consumer appreciates the fact that he gets much more duty per therm out of Tully gas than he did out of ordinary coal gas.

When we consider that the specific gravity of Tully gas is very similar to that of coal gas, and that there is a complete absence of naphthalene, no trouble need be experienced in distribution. Seeing that the consumption by the ordinary consumer is no more than with ordinary gas, the same thing applies.

I will bring my few remarks to a close by stating that, in my opinion, Tully gas is an ideal gas for both manufacture and distribution. It is quite safe, as it has a strong pungent odour, even more so than straight coal gas, and escapes are more easily detected and less likely to be tolerated. I feel that we are on the verge of great and important developments in the manufacture of gas, and you will no doubt be interested to know that this modern method of gas production and distribution is to be subjected to a thorough investigation and report by one of the leading members of the gas industry in Scotland. Need I say that I have no fear as to the results?

DISCUSSION.

Mr. HENRY RULE (Kelty), in opening the discussion, said there was no doubt that more pressure was required with lower-grade gas to give a satisfactory service to consumers. So far as residuals were concerned, it was purely a matter of £ *s. d.* whether complete gasification was to be carried out or whether the manufacture of coke, tar, and sulphate of ammonia was to be a paying speculation. Some little alterations were being made on the Tully gas plants, which would still lead to better results. The proportion of Tully gas that could be mixed with straight coal gas depended entirely upon the quality. He found that coming under 490 B.Th.U. there were more complaints.

Mr. R. J. GAVIN (Galashiels) and Mr. D. VASS (Perth) also took part in the discussion.

Mr. CAMPBELL (Dunfermline) then proceeded to read his paper on "Keeping a Grip of Things." See column two.

VOTE OF THANKS.

Mr. Campbell's paper was heartily received; and both the President and Mr. Campbell were accorded a cordial vote of thanks for their valuable contributions.

THE NEXT MEETING.

The HON. SECRETARY called the attention of the members to the next meeting on the 10th inst., at Cupar. This meeting would be quite informal; and he hoped the members would take this opportunity to bring up any matter which would provide discussion. He hoped to see the new members take an active part.

ON "KEEPING A GRIP OF THINGS."

FROM A PAPER BY MR. JAMES CAMPBELL, OF DUNFERMLINE, TO THE SCOTTISH JUNIOR GAS ASSOCIATION—EASTERN DISTRICT.

It has for long been a standing joke among those born south of the Tweed that it is inherent in a Scotsman to "keep a grip of things," and that what he gets he keeps. Without entering on a discussion as to the truth or otherwise of this impeachment, and to clear up any doubt in your minds as to the meaning of the title of this address, let me state at once that my intention is to put before you for consideration and discussion some points I have found useful in "keeping a grip" of the gas business.

Every man in charge of a business keeps records of a sort—varying according to his own ideas of what is necessary, or to his inclination in this direction. I know some managers of gas-works who have meetings of their directors only once or twice yearly, and who are not required to produce a monthly or quarterly statement of their work. This, I think, is a decided disadvantage to such managers, as nothing helps so much to keep a man "up to the mark" as the knowledge that his work is open to review and criticism every month; and I would say to those in this fortunate or unfortunate position that if they do not do so, they should for their own information keep proper records, even though no one but themselves should ever see them.

The first requisite of records is accessibility. It is of little use keeping records and statements unless the information they contain is so arranged that it can be procured instantly. If we want to refer to a letter, to know the price of a certain article, or to show our wages cost per 1000 c.ft. made last year, it should not be necessary to go through a mass of papers dealing with subjects totally irrelevant to that required at the moment.

In dealing with gas-works management, I will treat first of the carbonizing book, or, as we term it, our weekly report sheet. I have recently had this book made up on the loose-leaf principle—each sheet forming a week's record, which on completion is filed in the book. I will briefly run over the various items.

As headings you will find a space for recording that it is (say) the twentieth week of the financial year, and also the date of the end of the week. Opposite each day of the week are spaces for recording meter readings, gas made, stock, consumption, consumption on the corresponding day last year, coal used, yield of gas per ton, number of retorts working, gas made per retort, coals used per retort, average calorific value of gas made, B.Th.U. per ton of coal, coke used in producers, purifier inlet pressures, rotation of purifiers, retort-house governor gauge, and weather report. All coal and coke is weighed before passing to the hopper of our conveyor; so that we have an accurate record of our daily consumption. The week's totals are then recorded; and under these are spaces for figures of the corresponding week of last year—showing the increases or decreases thereon.

On the lower half of the sheet, we have the gas made up to the week-end this year and last year, together with the percentage increase or decrease, the average yield of gas per ton of coal to date, the average calorific value, and the B.Th.U. per ton to date, with the corresponding figures for last year. Then we have details relating to coal, giving the stock at the beginning of the week, coal received, coal carbonized, and the stock at the end of the week; also details of stock, production, and sales of coke.

An analysis of wages costs is shown, giving the allocations for the week, and also for the corresponding week last year, from May 16 to date, the corresponding period last year, the cost per 1000 c.ft. made for the week this year and last, and the cost per 1000 c.ft. made from May 16 to date, this year and last. At the bottom of the sheet are details of the works consumption of gas and water for the week, and also up to date, with last year's corresponding figures underneath.

We have here a fairly complete record of the week's work; and the advantage is great of knowing week by week exactly how our output and costs compare with last year and with our estimate of the year's working.

By regularly recording the purifier inlet pressures on this sheet, you may avoid having to deal (perhaps at an inopportune time) with what seems to be a sudden increase of pressure, but what is generally an accumulation of pressure over a period. Just two weeks ago, we found our pressures rising gradually day by day, traceable to one particular purifier; and knowing of this in time, the box was opened and the material loosened and replaced at work without any undue disturbance of routine—quite a different story from perhaps having all seals blowing at midnight. To digress, for a moment, all our purifiers have been converted to downward flow, which makes it much easier to deal with cases of caking oxide.

A separate sheet is made-up at the end of the "Weekly Report Book," showing the dates on which any vertical-retort was off for scurfing or otherwise, the dates when beds were started-up and let-down, the number of days working, &c.; while another sheet gives the dates when purifiers were put off or on, and also an analysis of both the oxide removed and that used for refilling.

When our estimate is made-up at the beginning of the financial year, all the items are priced-out per 1000 c.ft. of gas made; and each month when accounts are paid, the allocation for the materials used, together with wages, is carried to a statement, and also priced per 1000 c.ft. made, both for the month and for

the expired portion of the year; and these, placed alongside the estimate, enable one accurately to gauge the position up to date. This statement has been found most useful.

We have also a "Working Statistics Book," giving details of coal and coke as in the weekly report sheet, and also the monthly figures as to stock, production, and sales of tar and sulphate of ammonia, together with information as to stock, purchases, and consumption of sulphuric acid and lime. Bringing forward these figures to a summary, we have the coals carbonized, and the total quantities of coke, breeze, tar, and sulphate of ammonia produced, together with the figures for these residuals per ton of coal carbonized and the consumption of acid and lime per ton of sulphate made.

In every gas-works, there are certain small, but important, jobs that require periodical attention, and someone is usually detailed off to carry these out. If the interval is (say) monthly, there is a risk of the work's being overlooked, and causing trouble at an awkward time. To prevent this, a list has been drawn up of work to be attended to weekly, fortnightly, monthly, or quarterly as the case may be; and spaces are left opposite each job giving the dates when the work should be done. Whenever a man carries out any of these duties, he reports at the office, and it is marked off. Some of these duties are—blowing-off boilers, draining the bottoms of purifiers, changing the rotation of purifiers, greasing hoist guides and ropes, clearing drains, oiling and examining gasholder guide wheels, moving and oiling valves, &c. In many of these cases, "a stitch in time saves nine."

In this connection, I find it most useful to keep a record of work requiring to be done, maybe at a later date. All of us have had the experience of finding a defect in the depth of winter, which, while difficult to repair then, can be easily put right in the summer. It is well to have before you a programme of repairs when the light season arrives. For instance, I find from my notes last winter that a certain water supply was deficient, a drain from our new breaker pit was liable to flooding in winter, a valve did not shut-off quite tight, a seal was too light at maximum make, and so on. These were put right at a convenient season.

A form of index, such as is usually found at the end of a ledger, is used for various records. One of these gives details of all new plant installed. For instance, under "Compressor" we find the maker's name, type, capacity per hour, delivery pressure, revolutions per minute, steam pressure required, horse power, sizes of steam, gas, and excess pressure valves, price when ordered, when erected, and when started to work. Similar information is recorded for all plant installed. There is in every works certain plant and machinery requiring periodical renewal, and involving, at each time of ordering such renewals, the getting out of considerable detail. For this purpose we file in an index the exact requirement, which not only saves time, but ensures accuracy in ordering. Another index is used for catalogues, cross references being given, so that we may either refer to a particular maker or to a class of goods; while another index is used for general reference containing such items as the latest census returns for the district, local press cuttings, general information regarding taxation, references to items in the Technical Press, and so on.

In ordering goods, a point is made that no goods are supplied except on a written order. The order-book is indexed up, so that we have a compact record of all the orders given to a particular firm. In this index it is recorded when the goods were received, and when the account was passed for payment; and from this, statements of accounts are checked.

When a job such as (say) mainlaying is going on, all papers referring to it are kept together in a file, giving a complete history of the work from start to finish. Thus we file the engineer's estimate, the plan of route, accepted tenders for track-cutting and pipes, specification and schedule of quantities, sketches showing details of branches, &c., and finally the actual cost of the job. These files are, of course, indexed for reference.

In connection with our sulphate plant, the operator records on a sheet the times of making-up and of fishing the saturator, together with the twaddel at such times, and an estimate of the quantity fished. These sheets are booked daily; and from them we have a fairly accurate record of the sulphate in stock at any time, as well as a knowledge of the amount of sulphate made per man per shift.

Tests made on the sulphate plant, together with other works tests, are recorded on a laboratory report sheet, which includes gas analysis, average calorific value of gas, sulphur in gas, analysis of waste gases in settings, sulphate made, tests of waste liquor, devil liquor and waste gases, saturator acid tests (giving percentage of acid when making-up and when fishing), ammoniacal liquor tests, tests of sulphate made and sold, and any other tests. All these are not, of course, made daily; but provision is there for recording such as have been carried out on any day.

For personal use, I find it useful to keep a record of business to be brought before my Committee, remits from the Committee, and points for inclusion in my annual report.

In dealing with correspondence, we use the "Roneo" system of filing, under which each correspondent has a separate folder, in which are placed letters sent to, and received from, your correspondent. The system is capable of further subdivision in the case of firms with whom you may have a large amount of correspondence on different subjects. Thus for the British Sulphate of Ammonia Federation, we have folders for "Orders," "Monthly Returns," "Market Reports," "Circulars," and "General."

There are many other points, which, however, I will merely mention here—such as pressure charts both for works and district, records of main and service pipes, consumers' complaints, fitters' work, drawing office and general office organization, all of which are most important, but would occupy too much time in elaborating to-day.

One item I have yet to mention—an item which may at first sight appear to have no relation to my subject, but without which I am convinced no one can properly "keep a grip." I refer to keeping the works clean and orderly. If this is not done systematically, serious losses can be incurred through waste of materials, lost tools, &c.; and I am convinced that it pays to keep your works and plant in such a condition that you can have an inspection any day without preparation. Workmen are, I find, keen to appreciate the difference between a tidy and an untidy works; and they will, after a time, and of their own accord, maintain orderliness and cleanliness where formerly the reverse ruled. The force of example goes a long way, in the keeping of records and the running of the works; and the influence of one's early training in these respects is of the greatest consequence.

I have, of necessity, only given you the barest outline of the systems I have introduced in our works—making no claim to novelty or originality, and knowing that in the larger works much more elaborate records must be kept. But I hope to learn much from to-day's discussion as to the methods adopted by others in "keeping a grip of things."

NEW CARBONIZING PLANT FOR SCUNTHORPE.

The Moore Gas-Generator.

Circumstances give more than ordinary interest to the announcement that, in connection with the Scunthorpe and Frodingham Urban District Council's gas undertaking, contracts for a 500,000 c.ft. gasholder and steel tank and for carbonizing plant for the new gas-works, have been placed with Messrs. Ashmore, Benson, Pease, & Co., Ltd., of Stockton-on-Tees. The total cost involved amounts to about £32,000; and the work is to be completed in seven months. The special interest arises from the fact that this carbonizing plant appears likely to "revolutionize" the method of gas production there—judging by the claims put forward in favour of the process by the patentee, Mr. Samuel Moore, the Council's Gas Engineer and Manager.* The fact that the Gas Committee were unanimous in their recommendation to the Council to adopt this system of carbonization exclusively at the new gas-works seems to indicate that they are quite satisfied with the "Moore" system. It is stated that something like 35,000 c.ft. of gas per ton of coal carbonized has recently been obtained over an average month's working at Scunthorpe; but Mr. Moore expects very much better results than these when the new gas-works are completed.

For the "Moore" system of gas production, it is claimed that:

1.—An unusually large volume of medium-quality gas is obtained per ton of coal carbonized.
2.—The plant can be adjusted within a few minutes to produce any desired quality of coke—or to effect complete gasification of the coal, if preferred.
3.—Both the feed of coal and the extraction of coke are performed without interrupting the regular gas-making routine.
4.—Tar of the highest quality is produced; and all the available ammonia content is recoverable.
5.—The percentage of sulphur is very low.
6.—There are (*a*) no firebars, (*b*) no formation of clinker, and (*c*) no external producer.
7.—A "Moore" generator plant producing 425 to 450 B.Th.U. gas costs only about one-half the price of retort-settings of the same capacity.
8.—The erection of the plant can be accomplished in one-third the time required to erect either vertical or horizontal settings.
9.—Complete gasification of coal, coke, peat, or wood, if desired.
10.—Operating and maintenance charges extremely low.
11.—Repairs easily executed at little cost.
12.—Can be started-up from cold into full work in four hours.
13.—Can be shut-down and started-up daily, as required.
14.—Granted sufficient storage, the gas-works can be run without night work or Sunday labour.

Some of the foregoing claims are remarkable; but we are informed that Messrs. Ashmore, Benson, Pease, & Co., after exhaustive tests and experiment, have actually given the Council definite guarantees, subject to substantial penalties in case of non-fulfilment, in accordance with these statements. Gas men will be very interested, when the plant has been at work for a time, to have the actual results, which Mr. Moore promises will be in excess of those obtained from his experimental working.

* An abstract of the patent specification will be found on p. 446.

The first visit of the session of the Eastern District Section of the Scottish Junior Gas Association will take place next Saturday, to the Cupar Gas-Works, when Mr. J. M'Pherson (the Engineer and Manager) will give a *résumé* of "Six Years' Working with Woodall-Duckham Vertical Retorts."

THE MANUFACTURE OF HYDROGEN FOR AMMONIA SYNTHESIS.

By GEORGES CLAUDE ("COMPTES RENDUS," 1921)

[From "Industrial Gases."]

It is evident that the synthetic ammonia industry is entirely dependent on the cost of hydrogen. It is well known that the Germans have created formidable industrial cities solely for the needs of this industry. Hydrogen is there specially produced by apparatus representing a large part of the capital expenditure and labour. In quite a different manner, I have conceived the use of hyper-pressures, thereby considerably reducing the size of the units. For this reason, works can be erected anywhere where hydrogen is an industrial bye-product.

COKE-OVEN GAS.

Such is the case with coke-oven gas, for example, which is seldom used to the best advantage. By introducing a process for abstracting the hydrogen from such sources, a large part of the capital expenditure and labour is, *ipso facto*, avoided. Partial liquefaction of the gas in question can be employed in this case; but several troubles encountered during my former researches on water gas had led me to a very different principle. Of all common gases, hydrogen is by far the least soluble in liquids. One would imagine that this fact could be applied generally, and with advantage, for the very simple extraction of hydrogen from mixtures containing it—*e.g.*, water gas, town gas, and coke-oven gas. It will be merely necessary to send the compressed mixture into a suitable rectification column, down which is passing the solvent employed, in order that the hydrogen, in a pure state and under the initial pressure, may be withdrawn from the top. The remaining gases retained by the solvent will be evolved when the latter returns to atmospheric pressure, in such manner that the solvent can be used indefinitely with small losses.

The slight solubility of a few of the other gases—especially of CO—necessitates a rather high pressure; but this is no drawback, since the compression required is merely one stage in the ultimate hyper-compression of the hydrogen. The work required when introducing the solvent into the circuit is independent of the pressure; and the quantity of the solvent is inversely proportional to the pressure.

To minimize losses arising from the vapour tension of the solvent, low temperatures are essential. The expansion of the solvent charged with gas, which is essential to recover the work expended in its introduction, furnishes a source of energy for cold production. I therefore sought among organic liquids those possessing at the same time the property of readily dissolving CO and of dissolving the hydrogen relatively slightly. In these attempts, I have worked up to 1600 atmospheres; and this incursion into a little-known region has led to somewhat unexpected discoveries.

Through a small hyper-compressor, a mixture of equal parts of CO and hydrogen is introduced into a long, thick, steel tube of 150 c.c. internal capacity, and fitted with a metallic pressure gauge. Then 20 c.c. of the solvent are pumped in, causing the pressure to rise to a desired figure. The lower two-thirds of the tube are immersed in alcohol maintained at the selected temperature by means of liquid nitrogen. The tube is then agitated to obtain equilibrium. Then the liquid is withdrawn gradually, through a cock and capillary tube, into a small graduated tube, from which gas evolved can be collected in a measuring vessel. The liquid is next measured. The gas is measured and analyzed, corrections being introduced for atmospheric pressure, solubility, vapour tensions, &c. For another reason the experiments did not allow of great accuracy, and indicate only types of phenomena.

RESULTS USING ETHER.

With regard to the solubilities of CO and hydrogen in the best solvent, ordinary ether, under their respective partial pressures, it is seen that the solubility of hydrogen increases rapidly with the pressure. On the contrary, that of CO varies but little with the pressure at ordinary temperature, but decreases at low temperatures. It follows that the ratio of solubilities, $\frac{CO}{H}$ decreases rapidly as the pressure rises. The employment of high pressures therefore is to be avoided. It is not necessary to exceed 100 atmospheres. Moreover, the ratio of solubilities improves still more as the temperature falls. The improvement continues below $-40°$. At $-60°$ the ratio of solubilities at about 50 atmospheres is in the neighbourhood of 8. This is another reason for working at low temperatures. The presence of one gas in the solvent affects the solubility of another therein. The solubilities of hydrogen alone and CO alone have quite different values from what obtains when a mixture is considered. It is evidently this reciprocal action which explains a strange increase in the solubility co-efficients of liquids in gases, which is very marked. Thus, under a pressure of 1500 atmospheres, the 20 c.c. of ether entirely disappear as liquid into the gaseous contents, which amount then to 150 c.c. A closer examination has shown that ether is very slightly soluble in hydrogen, but much more so in CO. With CO alone a pressure of 350 atmospheres was sufficient to dissolve the 20 c.c.

The application of ether to the industrial separation of hydrogen and CO at pressures of about 100 atmospheres, and temperatures of the order of $-50°$, allows of the production of hydrogen containing less than 0·2 p.ct. of CO.

THE BOURCOUD PRODUCER FOR POWDERED FUEL.

In the course of a short description of the apparatus, published in "Industrial Gases," it is stated that, in the Bourcoud producer, by arranging for suitable control of the temperature of the air blast, and by adopting such a design that sufficient time is allowed for the several reactions to take place, the generation of producer gas from powdered fuel, or even from oil, has at last become practically possible.

The construction of the Bourcoud producer is very simple. It consists essentially of three principal sections. The first of these is the combustion chamber, into which a mixture of powdered coal and preheated air is introduced. In actual practice, it is found that the amount of fuel used is slightly in excess of the theoretically correct amount for perfect combustion. The mixture travels from the top to the bottom of the chamber, and then passes upwards through the second chamber, which has a much smaller cross-sectional area than the first chamber. The object of this reduction in area of the second chamber is to accelerate the velocity of flow of the gas, with a view to preventing as far as possible the deposition of solid matter at the bottom of the combustion chamber. This is of particular advantage if the fuel has an ash which is easily fused. In any case, however, the combustion chamber is provided with a suitable syphon for slagging-off melted ash. Entering the third chamber at the top (this chamber possesses the same cross-section as the combustion chamber), the gas finally leaves the apparatus at a temperature of about 1200° C. Owing to the changes in the direction and velocity of the gases in their passage through the producer, most of the ash will settle down at the bottom of the third chamber, from which it will be evacuated in the usual way. Any small amount of ash which may still be in suspension in the gases leaving the apparatus can be taken out, if required, by an ordinary dry-coke scrubber or other similar means.

The same apparatus can, it is claimed, be employed without any modification for practically any kind of fuel—solid, liquid, or gaseous. The primary air is heated in ordinary stoves of the regenerative type. Its temperature varies from 400° C. for good bituminous coal up to 1000° C. for crude oil and low-grade lignites. The final gas contains only traces of carbon dioxide and water; and all hydrocarbons are converted into permanent gases.

Presentation to Mr. J. W. Porter.—A silver rose bowl and silver flower vases were presented to Mr. J. W. Porter, on his retirement from the service of the Preston Gas Company, after a period of 37 years' association as collector and cashier. Mr. Samuel Tagg, the Engineer, made the presentation.

Explosion at the Blantyre Gas-Works.—Damage was caused to the Blantyre Gas-Works early last Saturday morning by an explosion which is believed to have occurred in the office or in the governor-house. The wall of the office and governor-house was blown out, and this had the effect of fracturing a holder. An outbreak of fire was quelled by the Cambuslang fire brigade. Fortunately, there was no loss of life or serious injury. All the books and documents were found intact; but as a result of the damage it was anticipated that Blantyre would be without gas for a day or two.

Quality of Gas at Yeadon.—A letter was read at last week's meeting of the Yeadon Urban District Council from the Yeadon and Guiseley Gas Company, who supply gas for street lighting in the district, repudiating allegations of poor gas, made at a previous meeting of the Council, and pointing out that the quality had never been below the stipulated value since the coal stoppage, and indeed had often exceeded this quality. Individual complaints—more than usually numerous lately—were due to obstruction of service-pipes; and the Company were making every effort to remedy this defect.

Maintenance Workers' Strike at Manchester.—A strike of maintenance workers of the Tramway, Gas, and Electricity Departments of the Manchester Corporation against wage reductions has been settled; the men having decided to accept the Corporation's terms. The terms agreed to are that in the case of the workers of the tramways and gas sections the matter in dispute should go to arbitration, and that in regard to the electricity men it should be dealt with by their own Whitley Council. The strikers held-out for a week against this separation of the electricity workers from the others, and declared that they only gave way finally because they had every reason to believe that there would be no differentiation in the final award.

Spalding Gas Supply.—Concurrently with the decision reached at their last meeting, to apply for a Provisional Order giving authority to instal electrical plant estimated to cost £8000, the Spalding Urban District Council determined also to reduce the price of gas charged to private consumers to 5s. net per 1000 c.ft., while an additional discount is to be granted to large consumers for power purposes, of 9d. per 1000 c.ft. In moving the reduction from 5s. 5d. to 5s., as recommended by the Gas Committee, Mr. Barker said that one salient consideration which led the Council to decide unanimously in favour of the change was that, on the past year's working, the Government had been paid £750 in income-tax, and it had been notified that, on this basis, the amount they were liable to be assessed for during the current year was £850.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Orders Obtained under Section One of the Gas Regulation Act, 1920.

SIR,—"Enquirer's" letter in your last issue quite correctly sets-out the position as I understand it. He rightly assumes that no variation will take place in the sliding-scale as a consequence of any alteration in the declared calorific value of the gas. I think perhaps some confusion of mind has been brought about by the fact that the Board of Trade, in assessing standard prices, took into consideration the calorific value of the gas prescribed or supplied by a company prior to the war for the purpose of converting the old standard price into its equivalent therm price, but did not altogether follow this procedure in connection with the slide penny per 1000 c.ft. In the latter case, they adopted an arbitrary adjustment on the basis of a calorific value of 500 B.Th.U., and therefore translated the penny per 1000 c ft. into 0·2d. per therm in all cases. Had they converted the penny per 1000 c.ft. strictly on the basis of the calorific value of the gas pre-war, the result would have been that, in the case of (say) a 550 B.Th.U. company, the equivalent per therm would have been 0·182d. This would have meant that the company would have been under the necessity of always changing its selling price by 0·182d., or multiples thereof, if they desired to preserve their slide dividend of 2s. 6d, p.ct. or 5s. p ct. as the case might be. A move in the selling price of 0 2 l. would have meant a modification in a 2s. 6d. slide dividend as follows:

$$\frac{0{\cdot}200}{0\ 182} \times 2s.\ 6d. = say, 2s.\ 9d.$$

Apparently the Board of Trade had this point in mind, and considered it more advisable, in view of the possibility of selling prices being confined to multiples of 0·2d., to preserve the slide dividends to which we are accustomed; and this, of course, could only be accomplished by adopting an arbitrary and universal adjustment in every case.

H. E. IBBS, Accountant.

Gas Light and Coke Company, Horseferry Road, S.W., Nov. 5, 1921.

The Old and the New Methods of Charging.

SIR,—Your readers may be interested in a short abstract I have been making of the comparative position of the leading Metropolitan and Suburban Gas Companies under the new *régime* of therm standard prices.

In calculating the therm prices old and new, I reduce them to the common and general denomination of the obligation to supply originally 14 candles, or 500 B.Th.U., as otherwise a clear and plain comparison is not possible owing to the wide differences in the declared values. It must be borne in mind that if we willingly depart (up or down) from the common basis, it can only be in the belief that the therm on the new selected and declared values will be easier or more expedient to supply with our plant and material resources at hand.

The following table shows the old obligations per therm at 14 candles, or 500 B.Th.U., together with the new price and the increase.

—	A Old Standard.		B New Standard.	Increase.
	Per 1000 C.Ft.	Pence per Therm.	Pence per Therm.	Pence per Therm.
South Suburban .	2/9	6·6	15·0	8·4
South Metropolitan	3/1	7·4	11·0(basic)	3·6
Gas Light and Coke	3/2	7·6	15·2	7·6
Mitcham* . . .	3/2	7·6	14·6	7·0
Commercial . . .	3/3	7·8	15·4	7·6
Tottenham . . .	3/8	8·8	17·6	8 8
Brentford . . .	3/9	9·0	17·8	8·8
Wandsworth . .	4/-	9 6	16·6	7·0
Croydon	4/7	11·0	17·8	6·8

* Part of Wandsworth, Wimbledon, and Epsom undertaking.

Omitting the South Suburban Company, whose original standard price was obviously too low, and the Wandsworth and Croydon Companies, which were rather early settlements and out of modern range, the general average of the original prices runs from 7·4d. for the larger undertakings to 9d. for the smaller ones.

The additions vary from 7d. to 7 6d., except where absence of shipping facilities gets 8·4d. to 8·8d. The South Metropolitan is, of course, a special case, in view of the safety of their basic price, which institutes a sliding-scale which can never operate against the shareholder.

The range in the new Orders is from 14·6d. for Mitcham to 15·4d. for Commercial and from 16·6d. in Wandsworth to 17·8d. for the companies not having their own shipping facilities Wandsworth gets 16·6d. by a smaller addition to a larger and less modern original standard of 9·6d.

Here, of course, the amount added to the therm price, calculated from the original standard per 1000 c.ft., produces great uniformity, corresponding with the uniform advances in cost.

Thus: Croydon get 6 8d.
Wandsworth and Mitcham get 7d.
Gas Light and Commercial get 7 6d.
South Suburban get 8·4d.
(which fails to pull-up the original low standard of 6 6d.).
While Tottenham and Brentford both get 8 8d.

Clearly, but for the original high prices of Wandsworth and Croydon and the comparatively low original price of South Suburban, the additional figure would have ranged about 7·5d. or so all round. This proves how uniformly the nine companies were feeling the advanced costs of coals, labour, and materials, and, further, how carefully and discriminatingly the condition and merits of all were weighed and adjusted by the Board of Trade.

I have before commented upon the care and precision shown by the Board of Trade in their adjudication; and the table above, when carefully dissected, supports my contention.

HY. E. JONES.

Palace Chambers, Westminster, Oct. 31, 1921.

P.S.—Your readers may be interested in the enclosed comparative table showing the advance in basic and actual prices due to the war and its consequences.

Sensible Heat Low-Temperature Distillation in Rotary Retorts.

SIR,—In your well-considered and fair editorial criticism of my article, you point out that no analysis of the high calorific town gas is given, nor do I state the capital cost of a plant of this description. Forgive my omission.

The composition of the gas varies naturally to some extent according to the bituminous slack used, and also how far the carbonizing is carried out in the rotary retort, and principally how the water gas producers are run.

I have some figures relating to a slightly better slack than the one on which the calculations were based in your last issue, and which will give a somewhat better B.Th.U. gas. The same object can be attained by washing the former slack and removing as much as possible of the dirt.

The carbonizing is carried out in the rotary retort at about 600° C., whereby 5250 c.ft. of low-temperature gas of the following composition is obtained:

CO_2	3 8 p.ct.
CO	4·5 ,,
CH_4	61·6 ,,
C_nH_m	8·0 ,,
H_2	17·3 ,,
O_2	1 0 ,,
N_2	3 8 ,,
	100·0 p.ct.

The semi-coke residue had the following average composition:

C	79·2 p.ct.
H_2	2·5 ,,
$N_2 + O_2$	4·5 ,,
S	1·2 ,,
Ash	10·6 ,,
Moisture	2·0 ,, (due to being exposed to the weather.)
	100·0 p.ct.

Volatile content about 6 p.ct.
Heating value; 12500 B.Th.U. per pound.

COMPARISON OF WORKING CONDITIONS OF THE LONDON AND SUBURBAN GAS UNDERTAKINGS.

Company.	Old System.									New System.						
	A		B		C		D			E			F		G	
	Standards Pre-War Quality.		Original Standard Price.		Actual Selling Price. Year 1913.		Selling Price for Year 1920.			1921 New Standards.			Actual December, 1921, Selling Prices.		Increase since 1913.	
	C.P.	B.T.U.	Per 1000 C.Ft.	Per Therm at 520 Assumed.	Per 1000 C.Ft. Gas Rental.	Per Therm at 520 Assumed.	Per 1000 C.Ft. Gas Rental.	Quality Assumed in Therms.	Price per Therm Assumed.	Per Therm.	Per 1000 C.Ft. at 500 Basis.	Declared Calorific Values.	Per Therm at Declared Values.	Per 1000 C.Ft.	Per 1000 C.Ft.	Per Therm.
			s. d.													
Wandsworth . .	14	520	4 0 / 3 2	9·2 / 7 3	24·7	4·7	53·6	470	11 4	15·6 avg.	78·0	470	14·8 avg.	69·6 avg.	44·9	10·1
Brentford . . .	14	520	3 9	8·7	27·8	5·3	58·2	460	12 6	17·8	89·0	460	14·6	67·1	39·3	9 3
Commercial . .	14	520	3 3	7·5	27·1	5·2	50·3	475	10·6	15·4	77·0	475	15·0	71·2	44·1	9 8
Gas Light . . .	14	520	3 2	7·3	28 9	5·6	53·2	475	11·2	15·2	76·0	475	14·0	66·5	37·6	8·4
South Metropolitan	14	520	3 1	7·1	25·2	4·8	54·3	550	9·9	11·0 basic	55·0	550	11·5	63·3	38·1	6 7
South Suburban .	14	520	2 0	6·3	29·5	5·7	61·8	460	13·4	15·0	75·0	460	14·6	67·2	37 7	8·9
Tottenham . . .	14	520	3 8	8 5	24·7	4 7	56·5	450	12 6	17·6	88·0	450	14·0	63·0	38·3	9·3
Croydon. . . .	14	520	4 7	10·6	29·1	5·6	53·6	470	11·4	17·8	89·0	470	13·8	64 8	35·7	8·2
Uxbridge . . .	14	520	4 3	9·8	40·1	7·7	62·9	460	13 7	18·4	92·0	460	17·6	81 0	40·9	9 9

The average analysis of the water gas was :

CO_2	3·3 p.ct.
CO	44·0 ,,
CH_4	0·4 ,,
H_2	48·6 ,,
N_2	3·7 ,,
	100·0 p.ct.

The production per ton of coke : 39·600 c.ft., or equivalent to 29,600 c.ft. per ton of raw slack.

The resulting mixed gas will then consist of water gas $\frac{29{\cdot}600}{29{\cdot}600 + 5250} = 0{\cdot}85$.

Low-temperature gas : $\frac{5250}{29\,600 + 5250} = 0{\cdot}15$.

Relation between low-temperature gas and water gas : $\frac{5250}{29600} = 0{\cdot}177$.

The average analysis of the mixed gas will then be :

Water Gas.	Low-Temp. Gas.	Mixed Gas.
CO_2 . 3·3×0·85= 2·8	3·8 × 0·15 = 0·57	3·37 p.ct.
CO .44·0×0·85=37·4	4·5 × 0·15 = 0·670	38·07 ,,
CH_4 . 0·4×0·85= 0·34	61·6 × 0·15 = 9·25	9·59 ,,
C_nH_m	8·0 × 0·15 = 1·20	1·20 ,,
H_2 .48·6×0·85=41·3	17·3 × 0·15 = 2·6	43·90 ,,
O_2	1·0 × 0·15 = 0·15	0·15 ,,
N_2 . 3·7×0·85= 3·15	3·8 × 0·15 = 0·57	3·72 ,,
84·99	15·010	100·00 ,,

The heating value of the mixed gas at 0° C. is 400 B.Th.U.

The amount of high calorific gas produced per ton of raw bituminous slack is : 29·600 + 5250 = 34·850 c.ft.

The percentage of inerts : 7·24.

The percentage of original heating value of raw slack (13,000 B.Th.U. per ton).

In the form of :	High-calorific gas	48·0 p.ct.
,, ,,	Low-calorific gas	26·5 ,,
,, ,,	Tar	11·4 ,,
	Total	85·9 ,,

From this must be deducted the steam requirements, about 0·4 lbs. per pound of coal, corresponding to about 0·75 boiler efficiency = 5·2 p.ct. So that the total thermal efficiency is 80 p.ct.

The average composition of the blow gas is :

CO_2	4·23 p.ct.
CO	28·43 ,,
CH_4	0·40 ,,
H_2	2·20 ,,
N_2	64·74 ,,
	100·00 p.ct.

The heating value of the blow gas is : 110 B.Th.U. per c.ft. The blow gas very strongly resembles ordinary blast-furnace gas, which is, of course, not to be wondered at, as the conditions prevailing during the blow period are, to all intents and purposes, the same as those in the CO_2 reduction zone in the blast-furnace.

I am of opinion that the practice of running the water-gas producer in such a way that the blow gas contains as high a percentage as possible of CO_2 is not to be recommended. If worked under these conditions, the blow gas may have a B.Th.U. value of about 60 to 70 B.Th.U. per c.ft. or less, and unless combusted directly above the generator in waste-heat boilers, the blow gas has no value whatever once the sensible heat cannot be utilized as well ; as the gas will be too poor to burn later on, and any B.Th.U. in the gas will represent a direct loss. Naturally, the water gas percentage might be somewhat higher ; but on the other hand, the overall thermal efficiency will certainly be lower. Therefore, I am of opinion that, in order to recover some useful B.Th.U. in the blow gas, it pays to sacrifice a little on the water-gas side.

Another point well worth considering is that the temperature under which the water-gas producer works is considerably lowered, as it will now be run more or less on the lines of a hot gas producer, and not as a furnace pure and simple.

I feel inclined to predict that clinkering trouble will be overcome effectively, much unpleasant labour will be avoided, and large-size producers with continuous feeding and revolving self-clinkering grates may eventually be employed.

I cannot help thinking that the present water gas producer design has not advanced to anything like the same degree as ordinary gas producers. The latter can be worked with an efficiency up to 90 p.ct. or more. This high efficiency is principally due to the continuous feeding and fuel levelling (whereby blow cores are avoided) and keeping the whole of the fuel bed in state of slow motion. And as the most suitable temperature for the water-gas reaction is between 1000° and 1200° C., why then go to much higher temperatures, with all the attendant drawbacks ?

I would also go so far as to advocate a uni-directional flow of steam, and do away with the reversing altogether, when the water gas is used for distilling purposes ; and I would admit a small proportion of steam during the blowing period as well. Perhaps I am preaching heresy ; but I am fully convinced that it is along these lines that improvements will and must come.

Regarding the capital cost of a plant capable of dealing with 100 tons of bituminous slack per twenty-four hours and producing from it 3,500,000 c.ft. of about 400 B.Th.U. gas per c.ft. will, at to-day's prices, be about £35,000.

The plant will consist of :

One rotary retort with drive, continuous charging and discharging devices.
Four continuously fed water gas producers.
One dust extracting cyclone.
Four annular air coolers, 40 ft. high by 8 ft. by 7 ft. diameter.
Two water-tube condensers.
One exhauster with bye-pass arrangements.
One "P. & A." extractor with bye-pass arrangement.
Two vertical double-spindle oil-washers, and one ammonia washer.
One static water separating tower.
Oil circulating pumps.
Ammonia liquor pumps.
Wash-oil tanks.
Liquor tanks.
Tar tanks.

The purifiers have not been included in this estimate as they depend too much on the sulphur content of the coal used to allow for any generalities.

From experience with a similar sized plant, the erection can be completed in three to four months, as there are no brickwork settings or flues to be built, which require slow drying and starting-up.

HARALD NIELSEN.

100, *Victoria Street, S.W.*,
Nov. 7, 1921.

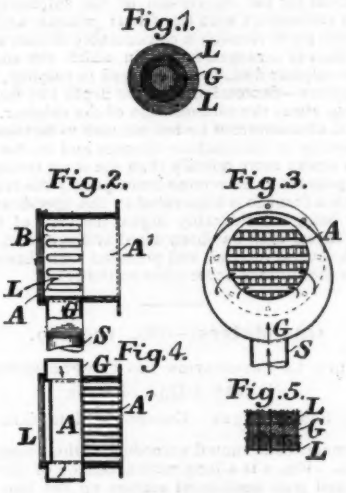
REGISTER OF PATENTS.

Bunsen Burners.—No. 143,907.

IRINYI, A., of Hamburg.

No. 14,585 ; May 28, 1920. Convention date, March, 1918.

This invention relates to bunsen burners, in which the burner-head is provided with a plurality of division walls closed in pairs at their rear ends for the separate supply of air and gas, as shown in the illustration. Fig. 1 is a transverse section of the flame of the usual bunsen burner ; figs. 2, 3, and 4 show the improved burner in vertical section, in cross section, and in horizontal section ; while fig. 5 is a diagram explaining the mixing of the gas and air.



Irinyi's Bunsen Burner.

In fig. 1, which shows a cross section of the flame of the usual bunsen burner, there is a stream of primary air L in the centre, surrounded by a stream of gas G, which latter is again surrounded by the wall of air forming the secondary air supply. If this ring is assumed to be cut-up, each layer of gas would lie between two layers of air—primary and secondary air. The burner-head is provided with division walls A connected in pairs at their rear ends so as to leave lateral openings, as shown in fig. 3, for the gas G entering through the pipe S. The stream of air L flows (as shown in figs. 2 and 4) through a mesh distributor or the like, so that it passes into the spaces B between the division walls A. As each pair of division walls is closed at one end and open at the other, the separated streams of air and gas flow in the form of layers, which become surrounded, and pass out from the forward end of the burner end. Due to the thickness of the walls of the divisions, an eddy is formed in front of the edge of the divisions ; and the cross section of the flame consists, therefore, of alternate layers of gas and air which flow in parallel streams and of layers in the form of eddies. As the eddies continue, and the portions of gas adjacent to them are gradually carried with it and converted into eddies, a complete mixture soon takes place, so that at a short distance away the whole flame is converted into many fine eddies.

By means of the division walls A^1, in the form of lattice-work serving as a mixing chamber and arranged in the burner-head in front of the division walls A, the gases as they leave the burner-bead cannot be ignited—ignition taking place only in front of the lattice-work A^1—so that the gas and air have time and space between the lattice-work, which serves as a distributor and mixer, to mix well before ignition. In consequence of the arrangement of the division walls A^1 in a plane intersecting the plane of the walls A of the burner-head, the layers of gas and air are finally divided into a large number of squares. The result is as shown in fig. 5. Between a large number of intersecting eddies the gas or air is passed in prism form in parallel streams ; and it is assumed that they are not mixed. In fact, the gas and air mix very quickly, so that care must be taken that any unmixed parts flowing in parallel streams are intimately mixed within a short distance of the burner-head—that is, from the point where the whole flame forms irregular eddies.

Diaphragms in Gas-Meters.—No. 169,349.

SUTHERLAND, A. G., of Erdington, Birmingham.

No. 22,190; July 26, 1920.

This invention comprises a method of securing a leather, rubber, or equivalent diaphragm to an annular member—such as the rim of a chamber or receptacle. Usually the fastening is effected by a contractile clip which is tightened by a screw; but "difficulties are experienced in preventing leakage at the point at which the contracting element is incorporated." To avoid leakage at this point, the patentee incorporates, in connection with such a clip in the region of the contracting member, a strip of metal of shallow channel section, the base of which is adapted to lie underneath the break in the clip, and the side limbs of which are adapted to occur one on each side of its extremities. This channel member forms a bridge which serves effectively to secure the leather or the like without leakage across the break in the clip

The clip may comprise a strip of metal having lugs (welded or brazed at each extremity) through which the contracting screw passes. Or the extremities of the strip may each be curled around a roller or pivot, perforated to accommodate the contracting screw.

Extracting Sulphur from Gases Containing Sulphuretted Hydrogen.—No. 169,467.

CHEMISCHE FABRIK RHENANIA, of Aix-la-Chapelle, and PROJAHN, F., of Germany.

No. 6921; March 6, 1920.

This invention relates to a process for the manufacture of sulphur from sulphuretted hydrogen, or gases containing more than 15 p.ct. thereof. It is passed—with the addition of the oxygen required for oxidation—at temperatures of over 300° (preferably 330°) downwardly through a layer of bauxite or other suitable contact material, of a thickness sufficient for the conversion of the sulphuretted hydrogen into sulphur in accordance with the Claus process, and subsequently passing the waste gases through a considerably thicker contact layer of (for example) bauxite arranged below, in which the sulphuretted hydrogen and the sulphur dioxide are reduced to sulphur, and which has a lower temperature—decreasing with the depth but not to an extent that would bring about the solidification of the sulphur.

The process is characterized by the mixture to be treated being supplied simultaneously to the working furnace and to the small control furnace, which works more quickly than the main furnace, and therefore renders it possible to determine more quickly the required gaseous mixtures. Such a furnace is illustrated in the specification; the furnace chamber being considerably higher (in view of the additional thicker contact layer) than has been usual hitherto, and is fitted in the upper part with several nozzles and provided with thermometer tubes projecting from the furnace cover close to the grate.

Gas-Meters.—No. 153,289.

COMPAGNIE POUR LA FABRICATION DES COMPTEURS ET MATERIEL D'USINES A GAZ, of Paris.

No. 27,275; Sept. 24, 1920. Convention date, Oct. 28, 1919.

One form of meter constructed according to this invention is shown in the engraving. Fig. 1 is a longitudinal section of the whole meter; fig. 2 is a plan and part horizontal section on the line A; fig. 3 is a vertical transversal section on the line B; and fig. 4 is a horizontal section on the lines C and D.

The meter comprises two bells E F, dipping in liquid in sufficient quantity so that their lower edges cannot "emerge out of the liquid." The bells move in spaces constituted by the external casing of the meter, which is divided by a partition G secured to a horizontal wall separating the chamber I, which is isolated from contact with the gas and in which the various parts that actuate the distributing and recording mechanism are operating.

The useful capacity of the reservoir in which the liquid is contained is limited in each of the compartments of the casing by the cylinders J K, which constitute, with the external casing, two spaces of annular section holding the liquid and in which the bells move. These cylinders are placed on a plate fixed above the bottom of the external casing, and forming, with the bottom, two chambers in prolongation of the cylinders, separated by a wall L. The chambers communicate respectively with passages M N ending at their upper extremity at the inlet and outlet valves O P in the distribution box fixed on the horizontal wall H.

Each of the bells is alternately submitted to an upward and downward thrust, according as the gas arrives under the bell by one of the cylinders, or in the external surrounding space, depending on the position of the distributing mechanism. Owing to these alternating thrusts in opposite directions, the bells automatically oscillate about the two axes Q, to which they are connected by arms engaging pivotally brackets fixed on the top of the bells and prolonged by rods engaging guides forming stays within the cylinders.

The arms pass through the walls surrounding externally the bells. To this end the walls are provided with perforations within which are fixed collars carrying the oscillating axes of the arms; and within these are located flexible membranes kept against a shoulder on the arms (at their centre) by a sleeve pressed by a nut. Counterweights placed at the ends of the arms follow the oscillating motion of the bells, and are connected by rods and cranks to an axis R, to which they impart a continuous motion of rotation. The axis carries two cranks, on which are connected two rods S operating the two admission and exit valves O P.

From this description it will be seen that each of the flexible membranes is arranged to close air-tight the perforation of the wall, while permitting the oscillation of the arm. It constitutes in fact an air-tight wall, and prevents absolutely the space in which the bell moves from receiving gas or allowing any to escape otherwise than through the passages connecting it to the inlet or outlet. On the other hand, the rubbing surfaces of the valves constituting themselves an air-tight joint, the space in which the various parts actuating the distribution and recording mechanism are moving is entirely isolated from any contact with the gas and with the vapours of the liquid.

Gas-Generator.—No. 168,951.

MOORE, S., of Scunthorpe, Lincolnshire.

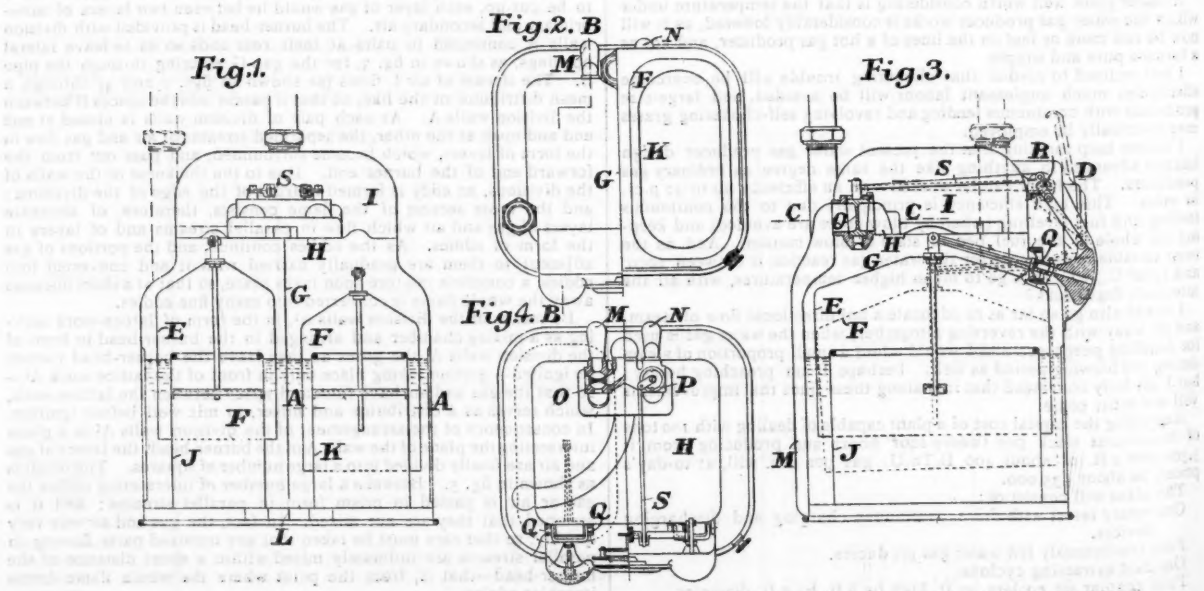
No. 13,035; May 11, 1920.

This invention relates to apparatus which consists of a generator, a fuel-feeding valve-controlled hopper, and coke or ash discharging mechanism at the top and bottom respectively of the apparatus. There are heating chambers for the passage of the secondary air blasts, and a series of chequered regenerators wherein combustion takes place.

Fig. 1 (p.447) is a sectional elevation and plan of the combined vertical coal-gas retort and water-gas generator; and fig. 2 is a sectional elevation of the apparatus at right angles to fig. 1.

The water-gas section B is arranged underneath the retort A, and both are enclosed in a single metal shell. A feeding hopper C at the top ensures a continuous supply of fuel. At the bottom of the generator mechanism D is arranged which extracts the coke or ash, and can be worked for any desired quality of coke; or, if complete gasification of the fuel is desired, the ash can be discharged at will and all clinker entirely prevented.

No outside producer is required, as a primary and a secondary air blast E F are employed to maintain the carbonizing temperature. The secondary air is passed through a heating chamber G, where it meets the blow gases, combustion takes place in a series of chequered regenerators H and the "blowing" period is reduced to a minimum.



A French Gas-Meter.

Liquid hydrocarbons can be injected at K, if extra enrichment is required.

An overhead bunker L is provided which, being supplied with suitable coal, allows the fuel to drop by gravity to the rim of the feeding hopper. A coal-valve, fitted to the top of the hopper, is opened or shut by a light chain [not shown], which reaches down to the operating stage. This valve is opened at stated intervals (according to the throughput required), and the hopper recharged with coal. The discharging gear D is operated by a lever on the operating stage. Longer or shorter intervals occur between each discharge according to the degree of carbonization preferred. The blow lasts about one minute and the run about six minutes; and the cycle may be continued during the charging or discharging operations without need for shutting-down.

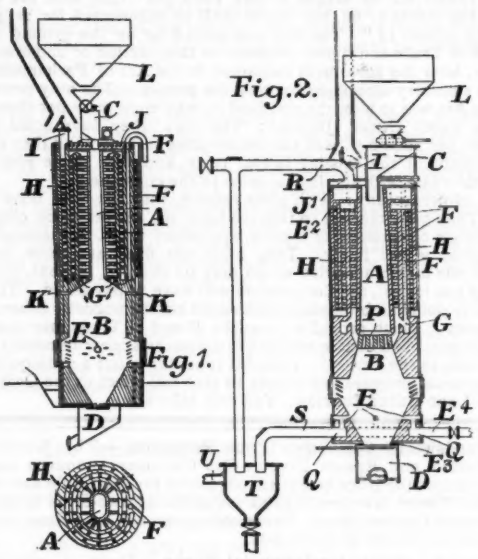


Fig. 1.

Fig. 2.

Moore's Gas-Generator.

Steam is admitted at four points E^1, E^2, E^3, and E^4. The steam, entering at the top of the generator shell at E^1, passes through a superheating chamber J, and thence to the top of the retort A. Travelling down the retort, it sweeps the coal gas into the water-gas zone, where the mixed gases are blended and fixed before exit. The steam admitted at E^2 at the base of the snift-pipe travels through the regenerators and enters the bottom of the retort through the combustion gas nostrils. This steam ejects any explosive gases remaining in the regenerator flues after each run. The steam admissions E^1 and E^2 serve for the down-runs; while those at E^3 and E^4 are for the up-runs. At E^3 steam is admitted occasionally, mainly for the purpose of quenching the coke before reaching the receiver D. Through the steam admission E^4 steam passes into the primary-air inlet-pipe E, whence it passes through the blast circulator Q, and into the generator by the blast-ducts E. Coming in contact with the incandescent coke in the generator, it combines to produce water gas. When up-steaming is "on" the primary-air valve is "off."

When the water gas is produced, it travels upward into immediate contact with the coal gas produced in the retort, and thence to the top gas outlet R through the steam superheating chamber J^1. On the down-run, the steam entering at the top travels through the coal gas and water gas zones and enters the blast-ducts E, and thence, by way of the blast circulator Q, passes through the bottom gas outlet S. The travel of the gas is through the same ducts as the upward steam and primary air, but in the opposite direction and at different intervals. The outcoming gas heats the blast circularizing chamber and the incoming air and, in sequence, the incoming steam.

For town use, the gas has two exits—one at the top of the apparatus (up-run exit R) and the other at the bottom (down-run exit S). Both outlet pipes enter a wash-box T, where a valve [not shown] on the end of the pipe S and on the end of the pipe in communication with the exit pipe R are sealed in gas liquor, and operated separately by iron rods terminating with a lever handle outside. When gas-making on the up-run, one handle opens the required valve, while the other remains closed. On the down-run, the operation is reversed. In either case, the gas passes to the outlet U of the wash-box and on to the gasholder.

Production of Illuminating Gas.—No. 148,820.

BIRKHOLZ, A., of Kilchberg, near Zurich.

No. 20,658; July 10, 1920. Convention date, Oct. 22, 1915.

This invention relates to apparatus for producing illuminating gas in vertical retorts by a continuous or an interrupted process. The invention is "based on practical experience and laboratory experiments, and involves a process differing from those hitherto known, while at the same time it provides for the fractionated distillation of the charge."

According to the invention (in the words of the patentee), the gases from the generator, on reaching the combustion chamber (approximately midway between the two ends of the retort), ignite in contact with the superheated secondary air and, moving through a direction chamber to the chamber containing the bituminous coal to be distilled, heat the latter. The gases pass upwards to the top of the retort, are collected, and then pass down the narrow sides of it to the lower part, beneath the combustion chamber, and are conducted again to the broad sides of the retort; thus heating the lower part. The gases are then led off to a recuperator, wherein the secondary air is heated by the "smoke gases" before the latter pass off to the flue.

By this arrangement the degree of heating can, it is said, be easily regulated according to the quality of the coal being worked; and, further, the distillation of the coal is divided into two separate phases—one, an intensive preliminary distillation, progressing to a maximum, the other weaker after-distillation, as is the case when working with a distilling apparatus.

By the process it is also possible to utilize the lower part of the retort for the continuous manufacture of water gas. In order to attain this result, it is necessary that a certain amount of hot gas, which was previously utilized for the distillation of the coal, be employed for maintaining the temperature of the water-gas generator, in order to compensate for the unavoidable loss of heat, resulting from the reduction of carbonic acid to carbonic oxide.

The continuous introduction of steam, which serves in the first place to extinguish the coke, provides a maximum output of water-gas in a continuous current, owing to the exterior heating, which maintains the temperature necessary for the process. The steam passing through the glowing coke is decomposed to oxygen and hydrogen at the same time lowering the temperature of the coke. In the further course of the process, the oxygen combines with part of the carbon of the coke to form carbonic acid, which is further reduced to carbonic oxide by combining with carbon. Part of the sulphur contained in the coke combines with the hydrogen to form sulphuretted hydrogen; and this mixture of gas, composed of CO, CO_2, H_2, CH_4, H_2S, &c., passes through the zone of the secondary distillation, enriching itself there with the hydrocarbons formed within this zone or fed to it from the outside. In passing into the zone of preliminary distillation, the temperature prevailing there will be sufficient to fix the mixture of carburetted water gas, and also serve as a superheater. The product thus obtained combines with the illuminating gas generated in the upper part of the retort.

The heating gases, after having effected the distillation of the coal, and then the generation of water gas, continue their passage to the lower end of the retort, whence they pass into the recuperator, giving off what heat they still possess to the secondary air, which is more or less heated according to the distance of the burners of the combustion chamber from the entrance.

In order to carry out the process, vertical furnaces of special construction are used, one form of which is illustrated in the specification.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for Nov. 27.]

Nos. 28,132 to 28,808.

BROADHEAD, R. W.—"Gas-purifiers." No. 28,399.
CLEGG, N.—"Device for eliminating vibration on gas-mantles." No. 28 719
CUMBERLAND COAL POWER AND CHEMICALS, LTD.—"Manufacture of ammonium sulphate." No. 28,557.
CUTLER, S.—"Gasholder guiding-gear." No. 28 651.
DANGERFIELD, A.—"Apparatus for treating materials with gases for drying, cooling, &c." No. 28,584.
DEMPSTER, R. & J., LTD.—See Broadhead, R.W. No. 28 399.
FABRY, R. F. F.—"Separator for removing solid or liquid particles from gases." No. 28,752.
FOSTER BROS., LTD.—"Pipe fittings." No. 28,795.
FOSTER, H F.—See Foster Bros. No. 28,795.
HARDIE, G. D.—"Gas-generator valves." No. 28,655.
HARGREAVES, H.—"Gas-control mechanism for urns, gas-boilers, &c." No 28,362.
HEUSCHKEL, A. F.—See Dangerfield, A. No. 28,584.
JACQUES, A.—See Cumberland Coal Power. No. 28,557.
KAY, F.—"Pipe connections." No. 28,165.
KIDDE & CO., INC, W.—"System for detection of smoke or particles in suspension in a gas. &c." No. 28,341.
MACLAURIN CARBONIZATION, LTD.—See Hardie, G. D. No. 28,655.
MARKS, E. C. R.—See Kidde & Co. No. 28,341.
MOLLER, E.—"Separating suspended particles from gases, &c." No. 28 757.
SEATON, J.—See Dangerfield, A. No. 28 584.
SIEMENS SCHUCKERTWERK—"Apparatus for precipitating dust from gases by electricity." No. 28,241.
STILL, E. H.—"Apparatus for heating water." No. 28,246.
STILL & SONS, LTD., W. M.—See Still, E. H. No. 28,246.
SULLY, E. S. & L. W.—"Atmospheric gas burners." No. 28,805.
TILLSTON, J. F.—See Clegg, N. No. 28,719.
TRENKLER, H. R.—"Method for recovery of sensible heat of gases in the Mond gas process." No. 28,756.
WARE, M. L.—See Dangerfield, A. No. 28,584.
WEST, J. H.—See Cumberland Coal Power. No. 28,557.
WILDEY, E. M.—"Apparatus for destructive distillation of shale, coal, &c." No. 28,432.
YATES, H. JAMES.—"Stoves, cookers, &c." No. 28,269.

PARLIAMENTARY INTELLIGENCE.

GAS REGULATION ACT.

Applications for Special Orders under Section 10.

Approval was given in the House of Commons last week to the motion standing in the name of Sir William Mitchell-Thomson in connection with the drafts of four Special Orders proposed to be made by the Board of Trade under section 10 of the Gas Regulation Act, 1920. The four undertakings referred to that are applying for the Special Orders are: The Hayling Island Gas Company, Ltd., the Newbury Corporation, the Plymouth and Stonehouse Gas Light and Coke Company, and the Wisbech Lighting Company.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE—KING'S BENCH DIVISION.

Friday, Nov. 4.

(*Before the* LORD CHIEF JUSTICE *and Justices* SANKEY *and* ACTON.)

In re Derby Gas (Charges) Order, 1921.

Mr. MONTGOMERY, K.C., moved for a rule *nisi* on behalf of the Corporation of the County Borough of Derby addressed to the Board of Trade for the purpose of bringing into the Court, and questioning, an Order made by the Board, called the Derby Gas (Charges) Order, 1921, or, in the alternative, clause 5 of the Order. The point in dispute was a simple one. Under the Gas Regulation Act, 1920 (10 and 11 Geo. V., chap. 28), a gas company might apply to the Board of Trade for an Order substituting a number of thermal units instead of the usual charge per 1000 c.ft. for gas; and in settling the Order the Board of Trade might make an addition in consideration of the additional cost of supplying gas resulting from the circumstances of the war. The powers of the Board of Trade were to transform the standard price into an equivalent price for thermal conditions; but the Derby Gas Company were a sliding-scale company, and the price was fixed at 2s. 10d. within the borough. The Company applied under the Act to have the standard altered into so much per therm. The Derby Corporation agreeing with them as to what the figure should be. The result was that the application went before the Board of Trade without opposition from the Corporation. It was provided not only that the application should be made, but that notice of the application should be given; and notices were given which provided for what the Board of Trade had to do—to alter the standard price per therm with an addition. It happened that in the Derby Gas Act, 1852, section 39, there had been inserted a parliamentary agreement between the Corporation and the Company as to the price of gas to be charged for lighting the public lamps. This section had been altered under another parliamentary agreement which was contained in section 12 of the Derby Gas Act, 1906 The original agreement had provided that the Company should afford a supply of gas for lighting the public lamps at a price equal to the lowest price charged by the Company for the time being to any private consumer. This arrangement was contained in section 12 of the Act of 1906. Section 39, regulating the supply of gas for the public lamps, was to be read and have effect as if the words "for lighting purposes" were inserted after the word "consumer" in the section; so that the Corporation did not get the benefit of gas supplied for heating purposes.

The LORD CHIEF JUSTICE: I suppose the use of gas for heating was unknown at that time.

Mr. MONTGOMERY: No doubt that is so. The proviso that was put in was that the price to be charged for gas supplied to the Corporation for lighting purposes should not exceed the lowest price for the time being charged by the Company to any person for lighting purposes or 2s. per 1000 c.ft., "whichever should be lower." The question really turned on the last few words. It was discovered that the Board of Trade had inserted words doing away with the 2s.; and they had transformed it into a price per therm which was equivalent to 4s. 10d., instead of 2s., if the calorific value was 500 B.Th.U. They had altered the parliamentary bargain by putting a maximum price which was double the figure which had been agreed between the Corporation and the Company.

The LORD CHIEF JUSTICE: The 4s. 10d. falls upon the private consumer just as much as on the Corporation.

Mr. MONTGOMERY: No, the Board of Trade have fixed a new standard price; but in article 5 they have put "that, after the declared date, the words 11·6d. per therm shall be substituted for 2s. per 1000 c.ft. in section 12." The rule was moved for on the ground that the Board of Trade could not, pursuant to that section or under any other power, alter the agreement contained in the Act of Parliament, which was a statutory agreement between the parties. The only power given by the Act was to alter the standard or maximum price per therm.

The LORD CHIEF JUSTICE: The view they have acted upon is that 2s. per 1000 c.ft. was the lowest price in 1906; and they give you the benefit of the existing lowest price, and then make your lowest price fluctuate with the lowest price to the consumers.

Mr. MONTGOMERY: With great respect, they have not done that at all. They have made it so that we have the lowest price charged to the private consumers, or a price equivalent to 4s. 4d. instead of 2s., whichever is the lower. They have not fixed any price, but have altered the maximum price which may be charged, so that, instead of getting gas for 2s., the Corporation will have to pay 4s. 4d. They seek to justify doing so by saying it comes within the words of subsection (*d*) of section 4, which provides "that the Board of Trade may make such supplemental and consequential provisions as appear necessary to give full effect to the Order." I submit that this is not a consequential or supplemental provision necessary to give full effect to the Order.

The LORD CHIEF JUSTICE: You may take a rule.

Wandsworth Company's Price Reduction.—The Wandsworth, Wimbledon, and Epsom District Gas Company announce that they have reduced the price of gas 1d. per therm for the whole area of their supply. There is a special extra reduction of two-fifths in the Wimbledon and Epsom limits. These reductions will date from the taking of the meter indices at Christmas.

A "CO" Poster for Industrial Works.—There is published by H.M. Stationery Office (price 2d. net) a cautionary carbon monoxide poisoning poster for use in industrial works. It indicates the precautions that should be taken when men are on work likely to involve exposure to the gas, and gives instructions for first aid, and for carrying out the Schafer method of artificial breathing.

Simmance Patent

DEAD BEAT PRESSURE RECORDERS

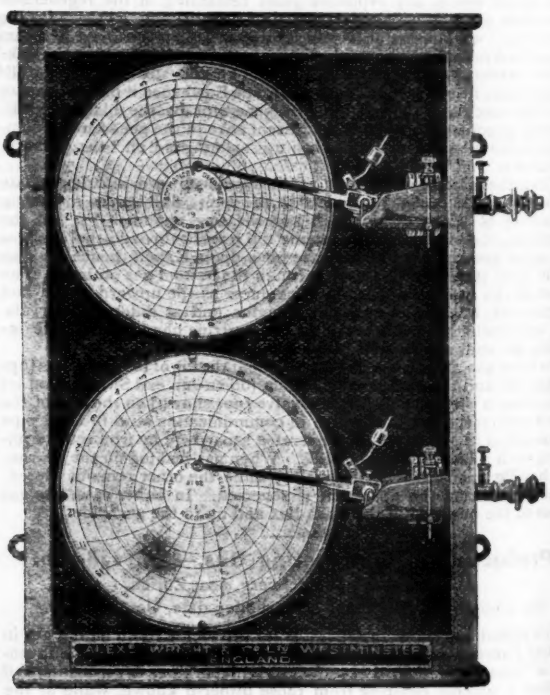
In BATTERIES of
Any number
Any range of
Pressure or Vacuum.

No Liquids.

Instant Zero adjustment.

Pressure released by turning cock.

Oscillations Obviated.



ALEXANDER WRIGHT & CO., LTD.,
WESTMINSTER, S.W. 1.

Telegrams: "Precision Vic." Telephone: Victoria 1207.

MISCELLANEOUS NEWS.

GAS REGULATION ACT ORDERS.

The Director of Gas Administration has forwarded copies of the following further Orders made by the Board of Trade under section 1 of the Gas Regulation Act.

Bridgwater Gas Light Company.

After the declared date the standard price in respect of gas supplied by the undertakers shall be 17d. per therm.

For the purpose of ascertaining the authorized rate of dividend for the year in which the declared date occurs, the price charged per 1000 c.ft. during that part of the year (if any) before the declared date shall be rendered into the equivalent price per therm by dividing it by four-and-one-quarter. (Nov. 2.)

Grays and Tilbury Gas Company.

After the declared date, the standard prices in respect of gas supplied by the undertakers shall be 20·4d. and 21 6d. per therm; and these prices respectively shall be substituted for the prices of 4s. 4d. and 4s. 10d. per 1000 c.ft. mentioned in section 44 (dividend dependent on price charged) of the Grays and Tilbury Gas Act, 1907.

For the purpose of ascertaining the authorized rate of dividend for the half year in which the declared date occurs, the price charged per 1000 c.ft. during that part of the half year (if any) before the declared date shall be rendered into the equivalent price per therm by dividing it by three-and-four-fifths. (Oct. 29)

Westbury Gas and Coke Company, Ltd.

As from the declared date, the maximum price in respect of gas supplied by the undertakers shall be 18d. per therm; and this price shall be substituted for the price of 4s. 4d. per 1000 c ft. wherever it occurs in section 25 (price of gas) of the Westbury Gas Order, 1897. (Nov. 1.)

GAS REGULATION ACT APPLICATIONS.

The following further notices have appeared in the "London Gazette" of applications by gas undertakings to the Board of Trade under section 1 of the Gas Regulation Act.

Denton Urban District Council.

The maximum price now authorized in respect of the supply of gas by the undertakers is 5s. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 2s. 3d. per therm.

Swanage Gas Company.

The maximum price now authorized in respect of the supply of gas by the undertakers is 5s. 6d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 2s. per therm.

Witney Gas and Coke Company, Ltd.

The maximum prices per 1000 c.ft. now authorized in respect of the supply of gas by the undertakers and the prices per therm they have asked the Board of Trade to substitute for these are as shown.

Area.	Present Maximum Prices per Therm.	Proposed Maximum Prices Per Therm.
	s. d.	d.
Parish and Urban District of Witney .	5 0	21·24
Parishes of Hailey, Minster Lovell, Curbridge, Cogges, and Ducklington	6 0	23·64

SPECIAL ORDER.

Dursley Gas Light and Coke Company, Ltd.

The Company have applied to the Board of Trade for a Special Order under section 10 to enable them to raise further capital to the extent of £15,000, and to borrow one-third of the amount so raised.

DECLARATION OF CALORIFIC POWER.

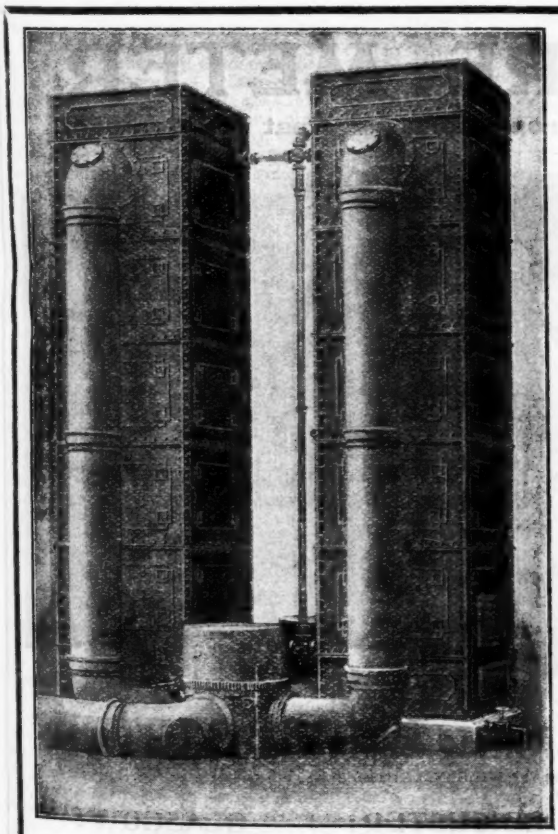
Andover Lighting and Power Company.—500 B.Th.U. (Dec. 1.)

GAS PRICES IN SOUTH LONDON.

Reference to the charges for gas in South London at the present time by the Gas Light and Coke Company and the South Metropolitan Gas Company was made at last week's meeting of the London County Council.

Mr. J. D. GILBERT, M.P., asked whether the Gas Light and Coke Company in South London were charging a higher price per therm for gas than the South Metropolitan Gas Company; if the Gas Light and Coke Company had legal powers to make such extra charge; and whether, under the old scale of prices for gas, they charged the same price per 1000 c.ft. as the South Metropolitan Gas Company in South London, and if the same rule did not apply now.

Sir GEORGE BETTESWORTH PIGGOTT, K.B.E. (Chairman of the Public Control Committee), replied that the price charged by the Gas Light and Coke Company was 13·2d. per therm, equivalent to 5s. 2¾d. per



"BEARSCOT" TUBING IN WATER CONDENSERS EXTENDS UPWARDS OF 150 MILES.

WATER-COOLED CONDENSERS

AS FITTED WITH THE **"BEARSCOT"** SAFE JOINT TUBE.

With our Central Port Fourway Valve the Condensers may be Reversed or Bye-passed as Required.

PARTICULARS WILL BE SUPPLIED UPON APPLICATION TO—

R. & J. DEMPSTER, LD.

Telegrams: "Scrubber Manchester"

MANCHESTER.

LONDON OFFICE:
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1000 c.ft., and by the South Metropolitan Gas Company 11·5d. per therm, equivalent to 5s. 3¼d. per 1000 c.ft. The fact that a lower amount per therm in the latter case produced a higher amount per 1000 c.ft. than in the case of the Gas Light and Coke Company was due to the difference in the declared calorific values of the gas supplied by the two Companies respectively. The Company could legally make such extra charge, provided there was no extra charge per 1000 c.ft. Under the old scale of prices, the Gas Light and Coke Company were not entitled to charge more per 1000 c.ft. for gas supplied south of the River Thames than the price charged by the South Metropolitan Gas Company. The Gas Light and Coke Company were acting on the same basis now.

Mr. GILBERT asked (arising out of the answer) if the Chairman could say whether the Public Control Committee made any tests of the gas supplied by the two Companies, in order to ascertain the calorific value.

Sir GEORGE PIGGOTT: Continuously we have inspectors going round to test the gas.

TESTING-STATION GASHOLDERS.

Revised Tenders.

On March 22 last, the Public Control Committee of the London County Council reported that they had accepted a tender, amounting to £3448, in respect of the extension of the Harrow Road weights and measures office for gas meter testing purposes; and on July 26 they submitted particulars of tenders received from three firms—out of seven selected firms invited to tender—for the supply of three pairs of gasholders and fittings at the office. In view of the fact that three of the firms quoted the same price—viz., £1050—the Council referred back the recommendation for the approval of the necessary capital estimate. In inviting the tenders in question, the firms were asked to quote for the supply of holders to match those already installed at the office. The original seven selected firms and one additional firm have since been invited to submit tenders for holders not necessarily of the pattern specified originally. However, only the under-mentioned revised tenders were received:

Parkinson and W. & B. Cowan, Ltd. (Parkinson Branch), City Road	£970
Thomas Glover & Co., Ltd., Edmonton	970
George Glover & Co., Ltd., Chelsea, S.W.	995
Gas Meter Company, Ltd., Kingsland Road, E.	997 10s.

The chief officer's estimate comparable with the tenders, which was based upon a contract entered into twenty years previously, amounted to £700. It does not appear practicable to obtain a lower tender elsewhere. The Committee stated that there is urgent need for the installation of the new holders in view of the pressure of work, which is likely to increase. The Committee therefore recommend acceptance of the tender of Parkinson and W. & B. Cowan, Ltd.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Nov.* 7.

The position of the London tar products market is quiet. Makers seem fairly well occupied with deliveries of pitch for export under contract, and to-day's value of this product is probably a little under 60s. per ton at makers' works.

The position of other products is steady, and the prices unaltered.

Tar Products in the Provinces.

Nov. 7.

The average values for gas-works products during last week were: Gas-works coal tar, 47s. 6d. to 51s. 6d. Pitch, East Coast, 57s. 6d. to 60s.; West Coast—Manchester, 50s. to 52s. 6d.; Liverpool, 50s. to 52s. 6d.; Clyde, 50s. to 52s. 6d. Benzole 90 p.ct. North, 2s. 4d. to 2s. 6d.; crude 65 p.ct. at 120° C., 1s. 11d. to 2s. naked at makers' works; 50-90 p.ct., naked, North, 2s. 3d. to 2s. 4d. Toluole, naked, North, 3s. to 3s. 1½d. nominal. Coal tar crude naphtha in bulk, North, 11d. to 11½d. Solvent naphtha, naked, North, 2s. 8d. to 2s. 9d. Heavy naphtha, North, 2s. 7d. to 2s. 9d. Creosote, in bulk, North, liquid, 7½d. to 7⅝d.; salty, 7d. to 7½d. Heavy oils, in bulk, North, 10½d. to 11½d. Carbolic acid, 60 p.ct., 1s. 6d. Naphthalene, £15 to £20; salts, £7 to £9, bags included. Anthracene, "A" quality, 8d. to 10d. per minimum 40 p.ct.; "B" quality, nominal.

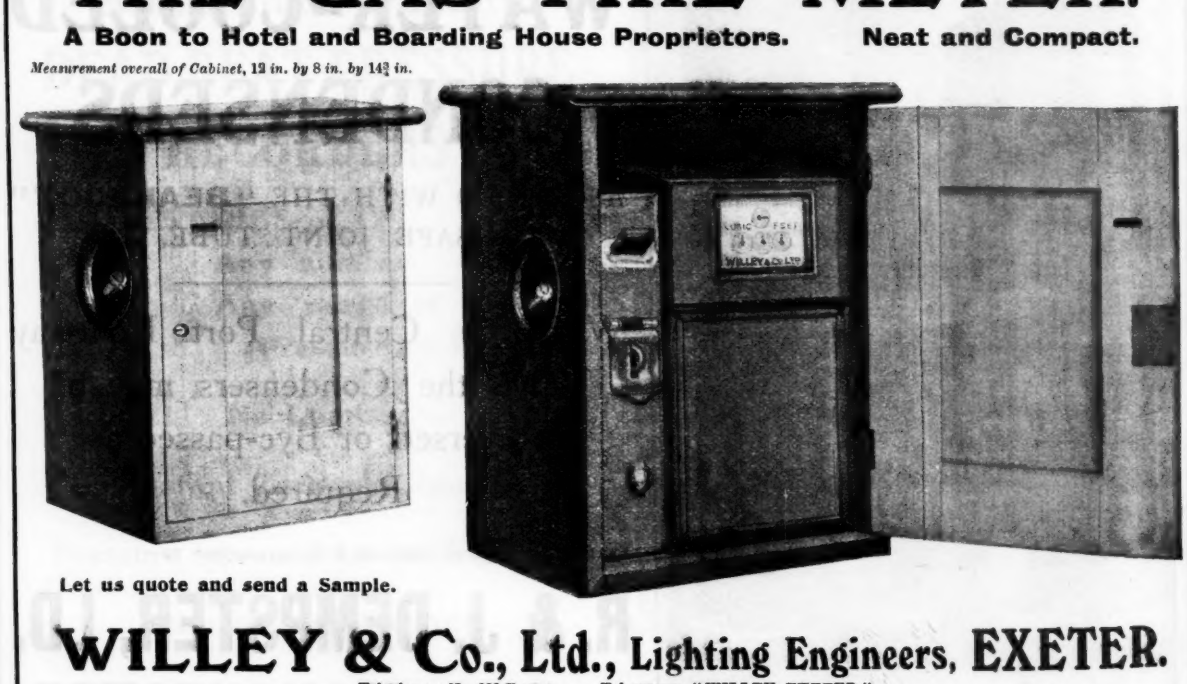
FROM A MARKET CORRESPONDENT.

The market appears very quiet. There is practically no business in pitch, although very low prices are reported from the North of England. The nominal price is about 50s. to 52s. 6d. per ton; but in South Wales even lower prices are mentioned. The demand for solvent naphtha remains fairly good, however; but there is a great amount of forward selling, with consequent irregular prices. In some quarters, 3s. per gallon is being asked; but one hears of business down to 2s. 9d. per gallon—a good deal of capital being made out of the coming increase of output, when, it is suggested, naphtha prices will move in the same way as pitch has done. Creosote is a quiet market at 8d. per gallon, and here again lower rates are anticipated on the theory that, although output of creosote is not yet very large, quotations will follow the general course of fuel oils. Benzole is in good demand, without change in quotations. Carbolic acid is nominally 1s. 6d. per gallon for crude 60's, and 6d. per lb. for 40 p.ct. crystals.

THE GAS FIRE METER.

A Boon to Hotel and Boarding House Proprietors. **Neat and Compact.**

Measurement overall of Cabinet, 12 *in. by* 8 *in. by* 14¾ *in.*



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WILLEY & Co., Ltd., Lighting Engineers, EXETER.

Telephone: No. 132 Exeter. Telegrams: "WILLEY, EXETER."

ALSO AT

LONDON: 89/95, Hertford Road, Kingsland, N. 1.

MANCHESTER: Saville Street, Oxford Road.

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GLASGOW: D. M. NELSON & CO., 20, West Campbell Street.

North-Eastern Showrooms: Cleveland Buildings, DARLINGTON.

There is very little business, and manufacturers state that it does not pay to produce at these figures. Cresylic acid remains quiet, and is quoted at 2s. 1d. for pale 97-99 p.ct. and 1s. for dark 95-97 p.ct. Naphthalenes range from £5 to £8 per ton for crude, according to quality, and refined from £14 to £18 per ton. Business in intermediate products has lately shown a much better tendency. More inquiries have been received from abroad and also from home users; and it looks as though old stocks in the hands of users were now about at their end. There is practically no change in quotations, however, although many commodities are getting into small compass, and advances in price are looked for.

Sulphate of Ammonia.

There has been only a small inquiry for this material for home agricultural uses; but inquiry on export account has improved considerably. Some fairly large quantities have been exported, which has had a brightening effect on the market. There is no change in prices; and it is hardly likely that any reduction can be expected. Farmers who are holding back their orders in hope of lower prices for this material are likely to be sadly disappointed; but there is nothing whatever to be gained by such a policy. Information from America is to the effect that the local demand has been very good of late. Many producers are sold out, and there is no longer any material being offered in the resale market. There is also a good export demand, although Japan seems to have pretty well taken care of her immediate requirements from Great Britain, which was her pre-war market.

The Tenterden (Kent) Gas Company have reduced the price of gas from 10s. to 7s. 6d. per 1000 c.ft.

STOCK MARKET REPORT.

THE Stock Exchange has had a better week on the whole, cheered by the actual reduction of the Bank rate; but this did not extend to all markets. In the gilt-edged, Home Government issues profited; Friday's figures for the big four being: Consols 48½ 49, War Loan 88-88½. Funding 71⅝-72, Victory 78-78⅜. Bonds and new Colonials were in fair demand. Home Rails fell; but the last prices were not the lowest. Canadians were steady, and Argentines firmer.

The Foreign Market was weak for the most part; but Argentine, Belgian, Chinese, and Japanese picked up a little at the close.

In the Miscellaneous group, Rubber and Oil made some recovery, and Iron and Steel were in good request.

Business in the Gas Market was on a fair average scale so far as volume was concerned; and a more liberal share of transactions was enjoyed by the minor undertakings. The most noteworthy feature was the remarkable firmness which characterized the listed companies in all parts of the world; the prices at which they changed hands being almost identical with those of the week before. A few quotations were slightly advanced; Gas Light preference being 1 higher, and Sheffield "B" and "C" 2 each. [Erratum in last report: In line 28, for "3½ p.ct. each" read "3½ p.ct. 1 each."]

Bargains done for cash during the week were as follows: On Monday, Brentford "A" 68½, Brighton and Hove original 115, ditto ordinary 84, European 6⅝, Gas Light ordinary 56½, 57, 57½, ditto maximum 44⅛, ditto preference 60, 60½, ditto debenture 51½, Hastings and St. Leonards 3½ p.ct. 35, 36 Hornsey 102½, Imperial Continental 139, Primitiva preference 38s. 8½d., South Metropolitan 66½, 68, ditto 6½ p.ct. debenture 100¾, 101½. On Tuesday, the London Stock Exchange was closed. On Wednesday, Alliance and Dublin 49½ Bombay 62s. 6d., Brentford "B" 64½, British 22⅞ 23 1/16. Commercial 4 p.ct. 56, Gas Light ordinary 56½, 57, 57⅛, ditto maximum 43, 44, ditto preference 59⅜, Hornsey 103, Imperial Continental 137, 137½, 139, Primitiva 13s., ditto preference 38s., Sheffield "B" 63, ditto "C" 62, South Metropolitan 67½, 67⅝, 68, ditto 6½ p.ct. debentures 100⅝-101½, South Suburban 68⅛, Tottenham "B" 54⅛, 54⅜, Wandsworth new 57, Malta and Mediterranean 7 p.ct. preference 50s., 51s. 3d., ditto second preference 47s. 6d., 48s. 9d., Metropolitan of Melbourne 6⅛. On Thursday Brentford "A" 68⅜, Brighton and Hove original 117, ditto ordinary 85⅛, British 22⅜, 23⅛, Commercial 4 p.ct. 56, ditto 3½ p.ct. 52½, Continental Union 19½, European 6½, Gas Light ordinary 56⅞, 57⅛, 57⅜, 57⅝, 57⅞, ditto maximum 44¼, 44½, ditto preference 60⅜ Imperial Continental 137, 137⅛, Lea Bridge 72, 72½, South Metropolitan 6½ p.ct. debenture 101½, 101⅝, Wandsworth new 57, 57⅛, Harrow and Stanmore 5 p.ct. 54, Redhill 5 p.ct. "B" 49½, 49⅜, Southend 5 p.ct. 50, 50½, ditto "B" 45, 45½, ditto 5 p.ct. preference 62½, 62⅝, Uxbridge and Wycombe 5 p.ct. 51. On Friday, Alliance and Dublin 49⅜, 49⅞, Bombay 62s. 6d., Brentford "A" 68½, ditto "B" 64, 64½, Brighton and Hove original 116½, 117½, ditto ordinary 85½. European 6⅜, 6 11/16, Gas Light ordinary 56⅜, 57, 57½, 57⅝, 57⅞, ditto maximum 44, ditto preference 59½, 60, ditto 10 p.ct. bonds 133, Imperial Continental 136, 138, South Metropolitan 67, 68, ditto 6½ p.ct. debenture 101½ 101⅝, Southend "B" 44½.

In the Money Market, the event of the week was the reduction of the Bank rate on Thursday from 5½ p.ct. (as fixed on July 12) to 5 p.ct. A demand then sprang up; but there was ample to meet all requirements. Discount terms became somewhat firmer. Silver was weaker, almost day to day, and closed at 39⅞.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
£			p.c.					
182,049	Stk.	Aug. 26	4	4%	Aldershot 4 p.c. Pref.	...	50—55	
1,551,868	,,	Oct. 13	2½	3 1/13%	Alliance & Dublin Ord.	59—64	48—51	49½—49⅞
374,000	,,	July 14	4	4%	Do. 4 p.c. Deb.	76—79	46—51	...
280,000	5	Aug. 11	7½	4/-	Bombay, Ltd.	5½—6½	3—3½	62/6
100,000	5	,,	16	4/7½	Bournemouth Gas and Water: 5 p.c.	...	7½—8½	...
583,110	10	,,	7	7/-	Bournemouth Gas and Water: B 7 p.c.	15—15½	8½—9½	...
115,000	10	,,	6	6/-	Bournemouth Gas and Water: Pref. 6 p.c.	13½—14	7½—8½	...
162,065	—	June 30	—	4%	Bournemouth Gas and Water: 4 p.c. Deb.	...	54—59	...
992,045	Stk.	July 15	14	56/-	Brentford A Consolid.	261—266	68—71	68½—68½
734,920	,,	,,	11	55/-	Do. B New	204—209	64—67	64—64½
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109—111	68—72	...
221,400	,,	June 15	4	4%	Do. 4 p.c. Deb.	91—93	57—59	...
214,775	,,	Aug. 26	11	10½%	Brighton & Hove Orig.	208—213	115—120	115—117½
244,200	,,	,,	8	7½%	Do. A Ord. Stk.	154—159	82—87	84—85½
1,287,500	Stk.	July 28	5	5%	Bristol 5 p.c. max.	...	...	...
530,000	20	Sept. 29	12½	10%	British	44—45	22—24	22½—23½
120,000	Stk.	June 30	4	4%	Do. 4 p.c. Deb. Stk.	88—90	55—58	...
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	42—45	...
100,000	10	May 27	—	6%	Cape Town & Dis., Ltd.	1½—2½	6½—7½	...
100,000	10	Oct. 28	—	4½%	Do. 4½ p.c. Pref.	4—6	4½—5½*	...
100,000	Stk.	June 30	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	53—58	...
137,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	...	...
1,513,280	,,	July 28	5/9/4	42/8	Commercial 4 p.c. Stk.	106—108	54—57	56
560,000	,,	,,	5½	38/4	Do. 3½ p.c. do.	103—105	51—54	52½
475,000	,,	June 15	3	3%	Do. 3 p.c. Deb. Stk.	69½—71½	44—47	...
800,000	,,	Dec. 11	4	—	Continental Union Ltd.	76—79	18—20	19½
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	30—35	...
51,600	,,	Aug. 26	15	15%	Croydon A 10 p.c.	...	150—155	...
278,400	—	,,	12	12%	Croydon B and C 7 p.c.	...	120—125	...
492,270	Stk.	—	6	4½%	Derby Con. Stk.	123—125	...	...
55,000	,,	—	4	4%	Do. Deb. Stk.	102—104	...	...
1,002,180	10	Jan. 29	10	5/0	European, Ltd.	17½—18	6½—7½	6½—6½
16,398,975	Stk.	Aug. 11	4/17/4	46/8	Gas Light and Coke: 4 p.c. Ord.	98—102	56—58	56½—57½
3,600,000	,,	,,	3½	35/-	Gas Light and Coke: 3½ p.c. max.	76—79	43—46	43—44½
4,062,235	,,	,,	4	4%	Gas Light and Coke: 4 p.c. Con. Pref.	96—99	59—61	59½—60½
4,674,850	,,	June 15	3	3%	Gas Light and Coke: 3 p.c. Con. Deb.	72½—74½	50—52	51½
130,000	,,	Dec. 11	10	10%	Gas Light and Coke: 10 p.c. Bonds.	...	...	133
82,500	,,	Sept. 14	5	3½%	Hastings & St. L. 5 p.c.	...	48—50	...
258,740	,,	,,	3½	2½%	Do. 3½ p.c.	87—89	34—36	35—36
70,000	10	May 12	11	5%	Hongkong & China, Ltd.	16½—16¾	5—6	
86,600	Stk.	Aug. 26	9	9½%	Hornsey 7 p.c.	...	100—105	102½—103
131,000	,,	July 28	7½	7½%	Ilford A and C	151—154	80—82	...
65,780	,,	,,	6½	5½%	Do. B	115—118	57—59	...
63,500	,,	June 30	4	4%	Do. 4 p.c. Deb.	92—94	54—56	...
1,976,000	,,	Oct. 28	9	5%	Imperial Continental	130—160	136—141*	136—139
1,235,000	,,	Aug. 11	5½	3½%	Do. 3½ p.c. Deb. Red.	84—86	81—83	
255,242	,,	Mar. 30	6½	3½%	Lea Bridge Ord. 5 p.c.	119—121	71—73	72—72½
2,498,905	,,	Feb. 26	10	37/6	Liverpool 5 p.c. Ord.	A. 211—213 B. 146—148	...	...
306,083	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	...	...	...
165,716	,,	Aug. 11	7/5/6	6%	Maidstone 5 p.c.	...	54—56	...
63,480	,,	Dec. 30	—	3%	Do. 5 p.c. Deb.	...	40—43	...
75,000	5	June 11	6	5%	Malta & Mediterranean	4½—4¾	1½—2½	...
250,000	100	Oct. 3	4½	4½%	Met. of Melbourne 4½ p.c. Deb.	99—101	88—96	...
541,920	Stk.	May 27	4	6%	Monte Video, Ltd.	11½—12	55—60	...
1,875,892	,,	July 28	4½	5%	Newcastle & Gatsh'dCon.	98½—99½	58—60	...
529,705	,,	June 30	3½	3½%	Do. 3½ p.c. Deb.	82—83	50—52	...
25,000	10	Aug. 26	—	7/6	North Middlesex 10 p.c.	...	12½—13½	...
55,940	10	,,	7/14/10	5/3	,, ,, 7 p.c.	14—15	7½—8½	...
300,000	Stk.	May 12	8	8%	Oriental, Ltd.	117—122	88—93	...
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7¾	2—3	...
188,120	Stk.	June 30	—	3½%	Plym'th & Stoneh'se 5 p.c.	...	64—67	...
60,000	50	Aug. 26	13	60/-	Portsea Island, B	128—131	64—67	...
100,000	50	,,	12	55/-	Do. C	118—121	51—54	...
249,980	5	April 29	8	—	Primitiva Ord.	5½—6	⅛—¼	13/-
499,960	5	June 26	5	—	Do. 5 p.c. Pref.	4½—5	1½—2	38/—38/8½
521,600	100	June 1	4	4%	Do. 4 p.c. Deb.	91—93	65—67	...
600,000	Stk.	July 28	4	4%	Do. ,, ,, 1911	...	42—45	...
546,198	,,	June 30	4	4%	River Plate 4 p.c. Deb.	85—87	42—45	...
150,000	10	Sept. 29	6	6/-	San Paulo: 6 p.c. Pref.	10½—11	6—6½	...
125,000	50	June 30	3	5%	San Paulo: 5 p.c. Deb.	47—49	35—38	...
135,000	Stk.	Aug. 26	10	5%	Sheffield A	223—224	61—62	...
209,984	,,	,,	10	5%	Do. B	222—224	62—64	63
523,500	,,	,,	10	4½%	Do. C	220—222	61—63	62
133,301	Stk.	Sept. 15	4	4%	Shrewsbury 5 p.c.	...	...	...
90,000	10	Oct. 28	9	8%	South African	10½—11½	7—9*	...
6,609,895	Stk.	July 28	5/4/0	5%	South Met. Ord.	111—113	66 69	66½—68
250,000	,,	July 14	—	5%	Do. Red. Pref.	...	93—95	...
1,895,445	,,	,,	5	5%	Do. 5 p.c. Deb.	72½—74½	48—50	...
224,820	,,	Feb. 25	8½	7½%	South Shields Con. Stk	157—159	88—90	...
1,087,795	,,	Aug. 11	6	5½%	S'th Suburb'n Ord. 5 p.c.	114—116	68—70	68½
368,837	,,	June 30	5	5%	Do. 5 p.c. Deb. Stk.	116—118	73—76	...
647,740	,,	May 12	7½	5½%	Southampton Ord.	99—102	55—58	...
121,275	,,	June 30	4	4%	Do. 4 p.c. Deb. Stk.	...	59—61	...
120,000		Aug. 11	—	6%	Tottenham: A 5 p.c.	135—138	63—65	...
782,275		,,	6	4½%	Tottenham: B 3½ p.c.	115—117	53—55	54½—54½
181,255		June 15	4	4%	District: 4 p.c. Deb.	87—89	54—57	...
182,380	1	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	...
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red	93—95	45—50	...
256,476	Stk	Aug. 26	5	5½%	Tynemouth 5 p.c. max	108½—109	66½—68½	...
					Wandsworth, Wimbledon, and Epsom—			
30,000	—	Aug. 11	8½	66/3	Wandsworth A 5 p.c.	151—156	78—80	...
255,636		,,	6½	51/3	Do. B 3½ p.c.	129—134	59—61	...
108,075	,,	,,	—	46/4½	Do. C	...	55—57	...
140,865	,,	,,	—	46/4½	New Ordinary	...	57—59	57—57½
152,000	,,	,,	6½	45/-	Wimbledon 5 p.c.	117—122	53—55	...
98,000	,,	,,	6½	50/-	Epsom 5 p.c.	121—126	56—58	...
88,476		June 30	5	3%	5 p.c. Deb. Stk.	66—69	44—47	

* Ex Div.

Coke-Oven Gas for Ossett.

By agreement with the Benzole and Bye-Products Company, at Crigglestone Collieries, the Ossett Corporation are to buy coke-oven gas in bulk, at a low charge, and purify it at their own gas-works for public use. The main for the conveyance of the gas from Crigglestone to Ossett has been completed; and the official opening took place on Wednesday last, when the members of the Ossett Corporation and visitors from other neighbouring councils attended. The party was received by Mr. J. H. Pizey, the General Manager, and Mr. J. A. Davy, Works Manager (ex-Chairman of the Midland Section of the Coke Oven Managers' Association), and were shown over the entire coking and bye-product plant. The plant recently installed for boosting the gas through the four-mile pipe-line to Ossett, was started by Alderman H Robinson, J.P. (Chairman of the Ossett Gas Committee). Subsequently the party were received at the Ossett Town Hall by the Mayor, and were conducted on an inspection of the gas-works, under the guidance of the Engineer (Mr. A. E. Mottram). Dinner was afterwards served at the Town Hall.

Taking Money from a Meter.—At Scarborough last week Rachael S onehouse was bound over for twelve months, and ordered to pay 7s. 6d. costs, for stealing 11s. 11d., the money of the Scarborough Gas Company. A meter inspector found there was only 2d. in a slot-meter at defendant's house; and it ought to have contained 12s. 1d. Subsequently, when a gas official and a detective visited the house, 5s. was recovered; the defendant saying she had spent the rest. The meter had been opened with a duplicate key.

Unreliable Electricity at Keighley.—The annual financial statement of the Keighley electricity undertaking, which has made itself notorious in recent months by a remarkable succession of breakdowns in supply both to Keighley itself and to the neighbouring town of Bingley, showed a gross profit of £11,353, but actually a net loss of £6423, owing to heavy payments in interest and to sinking fund. The report was severely critized at the Town Council meeting; Alderman Cass contending that year after year the Council were asked for just one year's grace, to be followed by a glowing account of the electricity department. They seemed to be told every year of abnormal expenses which it paid to meet, but which would not have to be met next year. He contended—and in this he was supported by another speaker—that the undertaking ought to be overhauled by an independent expert, to tell the Council what was wrong. In reply, Alderman Smith (Chairman of the Committee) denied that anything was wrong, pointed to the reduction in revenue owing to the industrial slump and the local factories being on short time, and said the department had not shown a loss until two years ago. The report was adopted by the Council. Just to keep up its reputation, there was a breakdown of supply on the night before the meeting; depriving of light for some time various shops, houses, and places of entertainment.

Lighting Trades, Ltd., of No. 103, Cannon Street, E.C., have been appointed sole selling agents of aluminium paint manufactured by Metal Powders, Ltd., which is extensively used for lamp-standards, gasholders, radiators, &c., and all kinds of metal work.

A decrease of £4385 on last quarter's gas-rentals has been reported to the West Bromwich Council. The Mayor explained that the Committee had not had the demand for the gas that they could supply; but the standing expenses had remained practically the same.

The staff and friends of Messrs. J & W. B. Smith, to the number of nearly a hundred, took part last Saturday evening in the first of a series of whist drives and dances, at the Eustace Miles Restaurant. Mr. Frederick Watkinson is the President, and Mr. A. Matton the Organizer.

A breakdown occurred at the Derby municipal electricity works on Tuesday afternoon of last week, due to the failure of one of the main generating switches. The whole of the power station was disorganized temporarily; and considerable inconvenience was caused to factories and shops.

Owing to the continued successful working of the "A & M." (Alder and Mackay, Ltd.) patent pressure wave automatic controllers, the Belfast and Burton-on-Trent Corporation Gas Departments have decided to enlarge their systems of automatic lighting to the extent of a further 144 at Belfast and 100 at Burton-on-Trent.

The Coroner returned a verdict of "Death from suffocation through inhaling coal gas by misadventure," in the case of a Brighton dairyman, named John Davis, who was found by his wife on the floor of their living-room as though he had fallen. The gas-ring, with which he usually boiled the water for tea, had been lifted from the fender to the top of the stove; but the gas-pipe was disconnected and lying on the floor. She smelt no gas at all. A doctor said deceased was quite dead when he arrived. There was no smell of gas. He might possibly have fainted with the ring in his hand, and the gas might then have overcome him because of the nearness of the pipe.

Messrs. Ashmore, Benson, Pease, & Co., Ltd., of Stockton-on-Tees, have just completed, at the Waddon works of the Croydon Gas Company, a four-lift gasholder with a working capacity of about 6,500,000 c.ft., with guide-framing tank guides, and tank framing. The outer lift is 223 ft. diameter and 44 ft. 9 in. deep; the total height from the coping level being about 172 ft 6 in., and the rise of the crown 18 ft. at the centre. The firm have also been entrusted by the Scunthorpe Urban District Council with the contract for the supply and erection of a steel tank 115 ft. diameter by 28 ft 6 in. deep, and two-lift gasholder, with guide-framing, excavations, and foundations, and a complete retort gas generating plant capable of producing 500,000 c.ft. of carburetted water gas per day, including ferro-concrete buildings, bunkers, &c. The firm have been repairing and reconstructing during the past two-and-a-half years gasholders and tanks for the European Gas Company at Havre, Rouen, Bolbec, and Amiens.

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